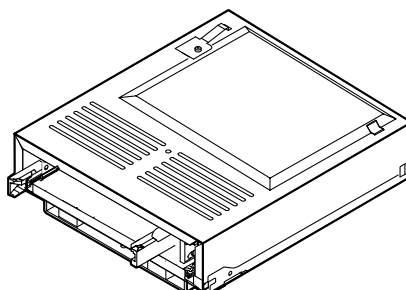


Service Manual



DVD-R7783

ORDER NO.
RRV3067

DVD-R/RW DRIVE UNIT

DVD-R7783

THIS MANUAL IS APPLICABLE TO THE FOLLOWING MODEL(S) AND TYPE(S).

Model	Type	Power Requirement	Remarks
DVD-R7783	ZUCYV/WL	DC Power supply from other system	

This service manual should be used together with the following manual(s).

Model No.	Order No.	Remarks
DRM-7000	RRV2173	700 DISC CHANGER
DRM-3000	RRV2734	300 DISC CHANGER

- For details on SCSI connections, refer to **Service Know-How (SKB05001)**.

NECESSARY INFORMATION FOR DHHS RULES
MARKED ON THE TOP COVER BELOW:

CAUTION – LASER RADIATION WHEN OPEN.
DO NOT STARE INTO BEAM



For details, refer to "Important Check Points for Good Servicing".

SAFETY INFORMATION



This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual. Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

WARNING
This product contains lead in solder and certain electrical parts contain chemicals which are known to the state of California to cause cancer, birth defects or other reproductive harm.

Health & Safety Code Section 25249.6 – Proposition 65

IMPORTANT

The pickup of this device conforms to Class 3A of the FDA Laser Restrictions (CFR21 PART 1040), and the device, which conforms to Class A as a total product, is not to be disassembled for repair in the U.S.A. or its territories. In other districts, the device must be disassembled for repair only by a specially instructed person with sufficient care against laser light.

VARO! —
AVATTAESSA JA SUOJALUKITUS
OHITETTAESSA OLET ALTTIINA
NÄKYMÄTTÖMÄLLE LASERSÄTEIYLLE.
ÄLÄ KATSO SÄTEESEEN.

ADVARSEL : —
USYNLIG LASERSTRÅLING VED ÅBNING
NÅR SIKKERHED SAFBRYDERE ER UDE AF
FUNKTION. UNDGÅ UDSÆTTELSE FOR
STRÅLING.

VARNING! —
OSYNLIG LASERSTRÅLNING NÄR DENNA
DEL ÄR ÖPPNAD OCH SPÄRREN
ÄR URKOPPLAD. BETRAKTA EJ STRÅLEN.



LASER
kuva 1
Lasersäteilyn
varoituserkki

WAVELENGTH : 658 nm

WARNING! —
DEVICE INCLUDES LASER DIODE WHICH
EMITS INVISIBLE INFRARED RADIATION
WHICH IS DANGEROUS TO EYES. THERE IS
A WARNING SIGN ACCORDING TO PICTURE
1 INSIDE THE DEVICE CLOSE TO THE LASER
DIODE.

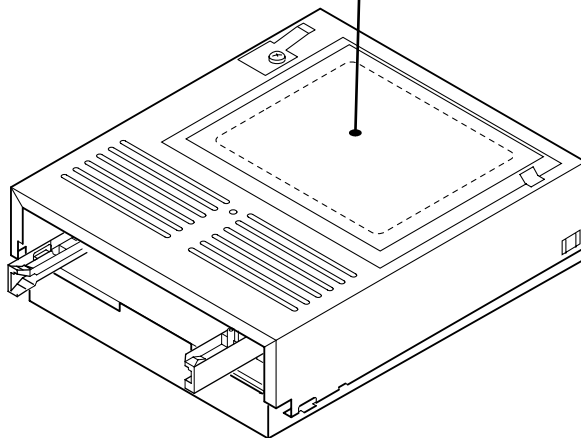
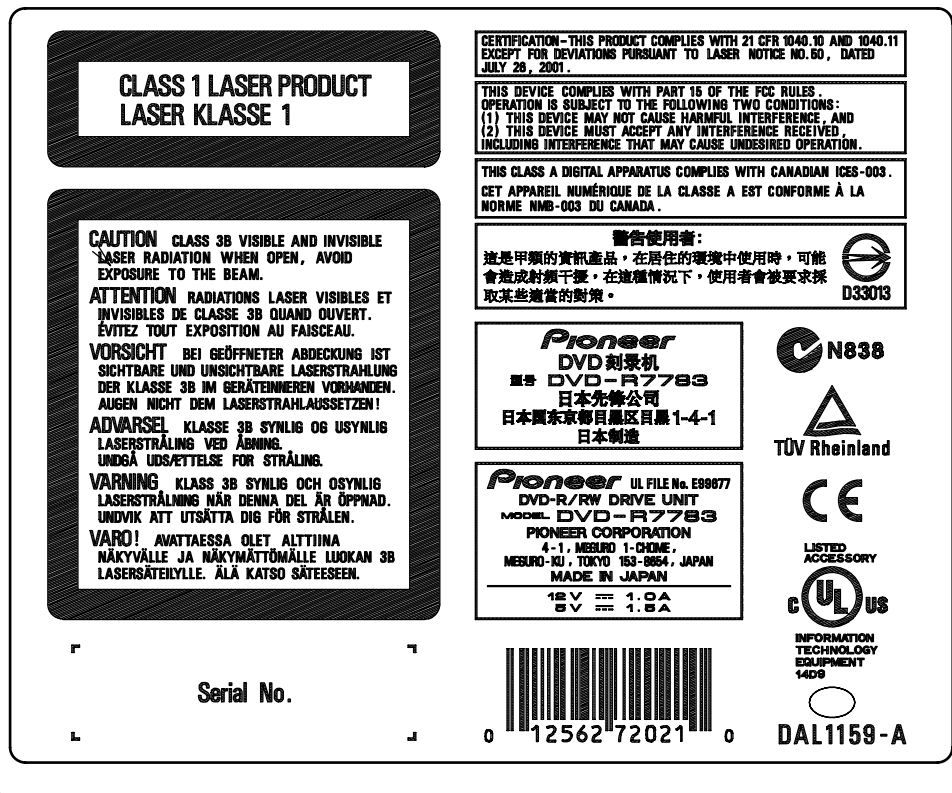


LASER
Picture 1
Warning sign for
laser radiation

IMPORTANT —
THIS PIONNER APPARATUS CONTAINS
LASER OF CLASS 1.
SERVICING OPERATION OF THE APPARATUS
SHOULD BE DONE BY A SPECIALLY
INSTRUCTED PERSON.

LASER DIODE CHARACTERISTICS —
MAXIMUM OUTPUT POWER : 35 mw

LABEL CHECK



Additional Laser Caution

1. The ON/OFF(ON:low level,OFF:high level) status of the CLAMP signals for detecting the loading state are detected by the drive CPUs, and the design prevents laser diode oscillation when the CLAMP signal turns OFF.
In normal operation, if no disc is clamped, the laser diode oscillation is disabled.
However, the interlock does not always operate in the test mode. *
2. When the cover is opened, close viewing of the objective lens with the naked eye will cause exposure to a Class 3A laser beam.

[Important Check Points for Good Servicing]

In this manual, procedures that must be performed during repairs are marked with the below symbol.
Please be sure to confirm and follow these procedures.

1. Product safety



Please conform to product regulations (such as safety and radiation regulations), and maintain a safe servicing environment by following the safety instructions described in this manual.

- ① Use specified parts for repair.

Use genuine parts. Be sure to use important parts for safety.

- ② Do not perform modifications without proper instructions.

Please follow the specified safety methods when modification(addition/change of parts) is required due to interferences such as radio/TV interference and foreign noise.

- ③ Make sure the soldering of repaired locations is properly performed.

When you solder while repairing, please be sure that there are no cold solder and other debris.
Soldering should be finished with the proper quantity. (Refer to the example)

- ④ Make sure the screws are tightly fastened.

Please be sure that all screws are fastened, and that there are no loose screws.

- ⑤ Make sure each connectors are correctly inserted.

Please be sure that all connectors are inserted, and that there are no imperfect insertion.

- ⑥ Make sure the wiring cables are set to their original state.

Please replace the wiring and cables to the original state after repairs.
In addition, be sure that there are no pinched wires, etc.

- ⑦ Make sure screws and soldering scraps do not remain inside the product.

Please check that neither solder debris nor screws remain inside the product.

- ⑧ There should be no semi-broken wires, scratches, melting, etc. on the coating of the power cord.

Damaged power cords may lead to fire accidents, so please be sure that there are no damages.
If you find a damaged power cord, please exchange it with a suitable one.

- ⑨ There should be no spark traces or similar marks on the power plug.

When spark traces or similar marks are found on the power supply plug, please check the connection and advise on secure connections and suitable usage. Please exchange the power cord if necessary.

- ⑩ Safe environment should be secured during servicing.

When you perform repairs, please pay attention to static electricity, furniture, household articles, etc. in order to prevent injuries.
Please pay attention to your surroundings and repair safely.

2. Adjustments



To keep the original performance of the products, optimum adjustments and confirmation of characteristics within specification.
Adjustments should be performed in accordance with the procedures/instructions described in this manual.

3. Lubricants, Glues, and Replacement parts



Use grease and adhesives that are equal to the specified substance.
Make sure the proper amount is applied.

4. Cleaning



For parts that require cleaning, such as optical pickups, tape deck heads, lenses and mirrors used in projection monitors, proper cleaning should be performed to restore their performances.

5. Shipping mode and Shipping screws



To protect products from damages or failures during transit, the shipping mode should be set or the shipping screws should be installed before shipment. Please be sure to follow this method especially if it is specified in this manual.

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1. SPECIFICATIONS

[Supported Formats]

Writing format

DVD-R for General Ver. 2.0	Disc at Once, Incremental
DVD-RW Ver. 1.2	Disc at Once, Incremental, Restricted Overwrite
*	Recommended number of overwrites on DVD-RW media: 100 times or less (at normal room temperature).

Reading format

DVD-ROM, DVD-Video
DVD-R (for General / Authoring 3.95 GB, 4.7 GB)
DVD-RW Ver. 1.1, Ver. 1.2
CD-ROM Mode 1
CD-ROM XA Mode 2 (form 1, form 2)
CD-R, CD-DA, CD-Extra, Video CD

- DVD+R/RWs, DVD-RAMs and CD-RWs cannot be read nor written.
- Does not support recording on CD-R media.

[Writing/Reading speed]

Writing Speed

DVD-R for General Ver. 2.0 Rev. 3.....	8X (ZCLV), 6X (CLV), 4X (CLV)
DVD-RW Ver. 1.2	4X (CLV), 2X (CLV)

Reading Speed (max.)

DVD-ROM (single)	12X (CAV)
DVD-ROM (dual)	8X (CAV)
DVD-R	8X (CAV)
DVD-RW	8X (CAV)
CD-ROM	40X (CAV)
CD-R	40X (CAV)
CD-DA	40X (CAV)
Video CD	9.3X (CAV)

[Reading Performance]

Data transmission speed (Sustained max.)

DVD-ROM (single)	16620 KB/sec
DVD-ROM (dual)	11080 KB/sec
DVD-R	11080 KB/sec
DVD-RW	11080 KB/sec
CD-ROM	6000 KB/sec
CD-R	6000 KB/sec

Note that the transmission speed may vary depending on the state (e.g., the existence of scratches) of the disc being used.

Access time (Random average)

DVD-ROM (single)	140 ms
DVD-ROM (dual)	160 ms
DVD-R	150 ms
DVD-RW	150 ms
CD-ROM	130 ms
CD-R/RW	130 ms

■ 5 ■ 6 ■ 7 ■ 8 ■

[Data buffer capacity]

2.0 MBytes (writing, reading)

A

[Interface]

Wide Ultra-2 SCSI (80 MB/s)

* Maximum effective speed approx. 40 MB/s

[Buffer under-run free mode]

Although the default setting is ON, this setting can be changed to OFF depending on the application in use. This mode is locked in the ON mode and cannot be turned off during the 8X (ZCLV) recording of a DVD-R.

[Others]

Power supply DC +12 V, 1.0 A

DC +5 V, 1.5 A

B

External dimensions 187.9 (W) x 73.3 (H) x 260.7 (D) mm
7-3/8 (W) x 2-7/8 (H) x 10-1/4 (D) in.

Weight 2.0 kg (4.4 lb)

Operation temperature +5 °C to +35 °C (+41 °F to +95 °F)

(The temperature outside the changer)

Operation humidity 5 % to 85 % (no condensation)

(The humidity outside the changer)

Storage temperature -40 °C to +60 °C (-40 °F to +140 °F)

Storage humidity 5 % to 90 % (no condensation)

- Discs recorded on this unit may not playback properly on players or drives which do not support the same media format.
- Specifications and design subject to possible modifications without notice, due to improvements.


C

D

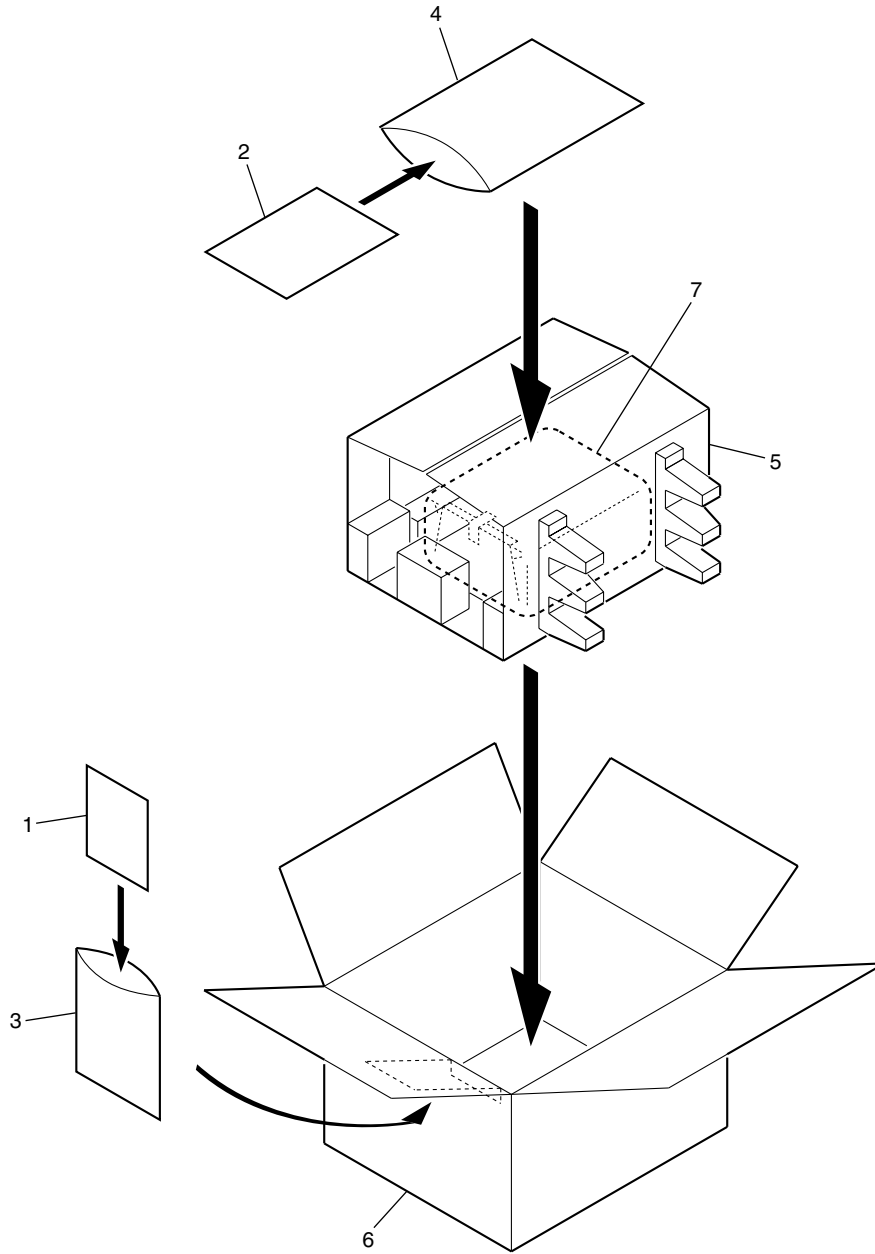
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2. EXPLODED VIEWS AND PARTS LIST

- NOTES:
- Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.
 - The  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
 - Screws adjacent to ▼ mark on product are used for disassembly.
 - For the applying amount of lubricants or glue, follow the instructions in this manual.
(In the case of no amount instructions, apply as you think it appropriate.)

2.1 PACKING



PACKING Parts List

<u>Mark</u>	<u>No.</u>	<u>Description</u>	<u>Part No.</u>
NSP	1	Warranty Card	ARY1093
	2	Operating Instructions (English / French / German / Chinese / Japanese)	DRC1229
NSP	3	Polyethylene Bag (0.018 x 100 x 230)	Z21-010
NSP	4	Polyethylene Bag (0.03 x 230 x 340)	Z21-038
	5	Pad	DHA1494
	6	Packing Case	DHG2455
	7	Bag	DHL1052

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2.2 EXTERIOR SECTION

Note ;

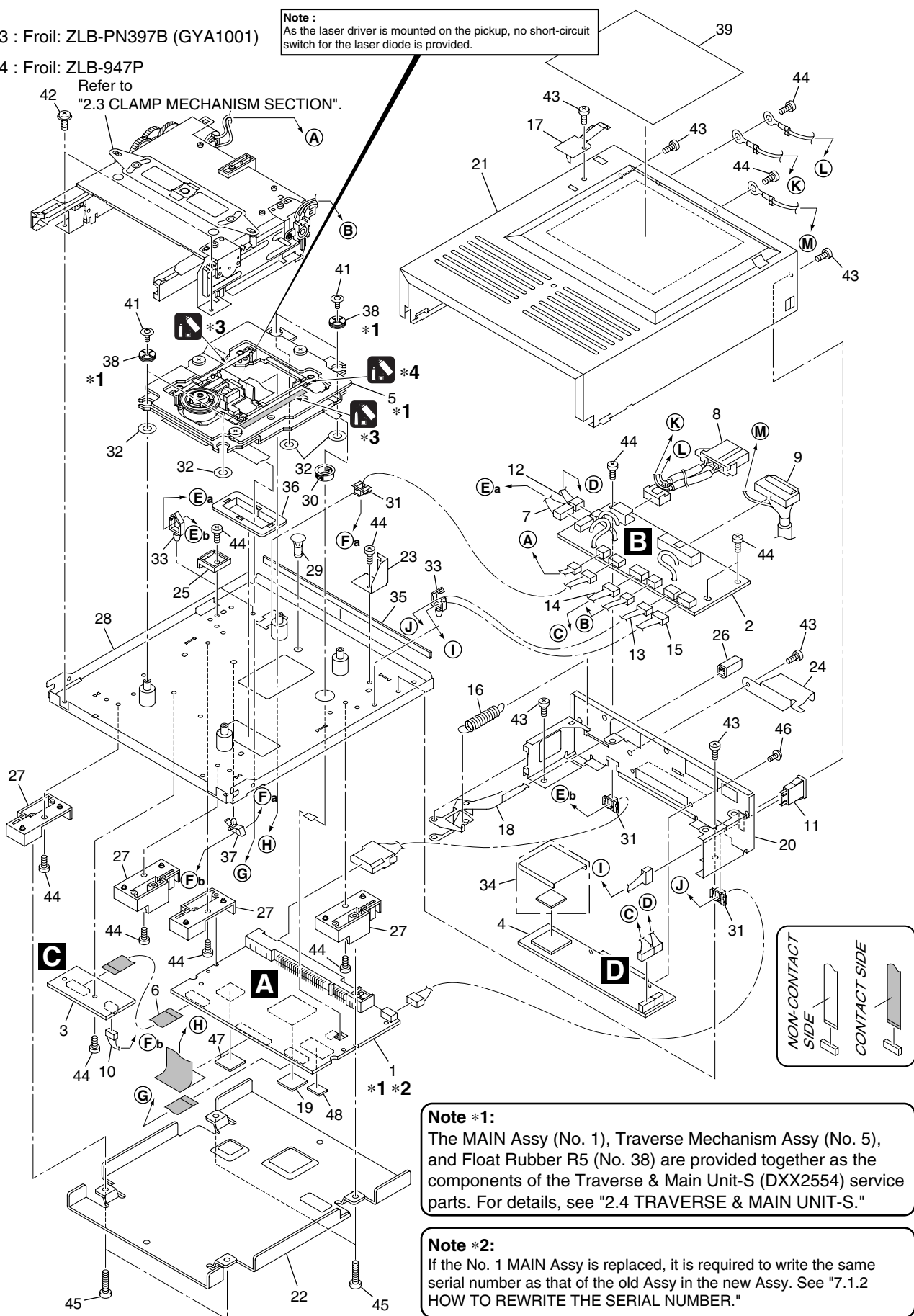
*3 : Froil: ZLB-PN397B (GYA1001)

*4 : Froil: ZLB-947P

Refer to
"2.3 CLAMP MECHANISM SECTION".

Note :

As the laser driver is mounted on the pickup, no short-circuit switch for the laser diode is provided.

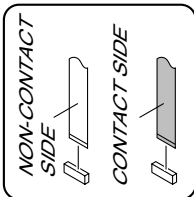


Note *1:

The MAIN Assy (No. 1), Traverse Mechanism Assy (No. 5), and Float Rubber R5 (No. 38) are provided together as the components of the Traverse & Main Unit-S (DXX2554) service parts. For details, see "2.4 TRAVERSE & MAIN UNIT-S."

Note *2:

If the No. 1 MAIN Assy is replaced, it is required to write the same serial number as that of the old Assy in the new Assy. See "7.1.2 HOW TO REWRITE THE SERIAL NUMBER."



EXTERIOR SECTION Parts List

Mark No.	Description	Part No.	
1	MAIN Assy	DXX2554(1/2)(*1)(*2)	
2	WIFB Assy	DWX2388	A
3	FCRB Assy	DWX2389	
4	ATAPI/SCSI Board	DWP1082	
5	Traverse Mechanism Assy	DXX2554(2/2)(*1)	
6	Flexible Cable (12P)	DDD1268	
7	Connector Assy	DKP3486	■
8	Connector Assy	DKP3537	
9	Connector Assy (20P)	DKP3675	
10	Connector Assy (4P)	DKP3676	
11	Rotary Switch	DSX1063	B
12	Connector Assy	PD02EE-D17	
13	Connector Assy	PF04PP-B22	
14	Connector Assy	PF05PP-B15	
15	Connector Assy	PG05MM-G17	
16	PL Lock Spring	DBH1447	■
17	PL Earth Plate	DBK1174	
18	PL Lock Arm	DBK1187	
19	Silicone Sheet B	DEB1520	
20	PL Rear Panel (R7)	DNC1702	C
21	Upper Cover DR	DNE1493	
22	Bottom Plate (R7)	DNF1698	
23	Board Stay	DNF1699	
24	PL Grip	DNH2399	
25	PL Rail	DNK3665	■
26	PL Lock Cap	DNK3667	
27	Board Hook	DNK4327	
28	PL Base (R7) Assy	DXB1823	
29	Card Spacer	AEC7133	
30	Bush	DEC1220	D
31	Edge Saddle (0607U)	DEC1807	
32	Slider Washer	DEC2213	
33	Locking Mini Clamp	DEC2439	
34	IC Cover	DEC2701	■
35	Acetate Tape (164 x 10)	DED1141	
36	Protector V2	DNK3393	
NSP 37	Mini Clamp	VEC1597	
38	Float Rubber R5 (This part is also available as an optional part.)	DEB1556 (*1)	E
NSP 39	Model Label	DAL1159	
40	●●●●●		
41	Float Screw	DBA1246	
42	Screw	DBA1258	■
43	Screw	BBT30P060FTB	
44	Screw	BBZ30P060FTC	
45	Screw	BBZ30P180FTC	
46	Screw	PMA26P060FNI	F
47	Silicone Sheet R5 A	DEB1572	
48	Silicone Sheet R7 A	DEB1673	

1 2 3 4

2.3 CLAMP MECHANISM SECTION

A

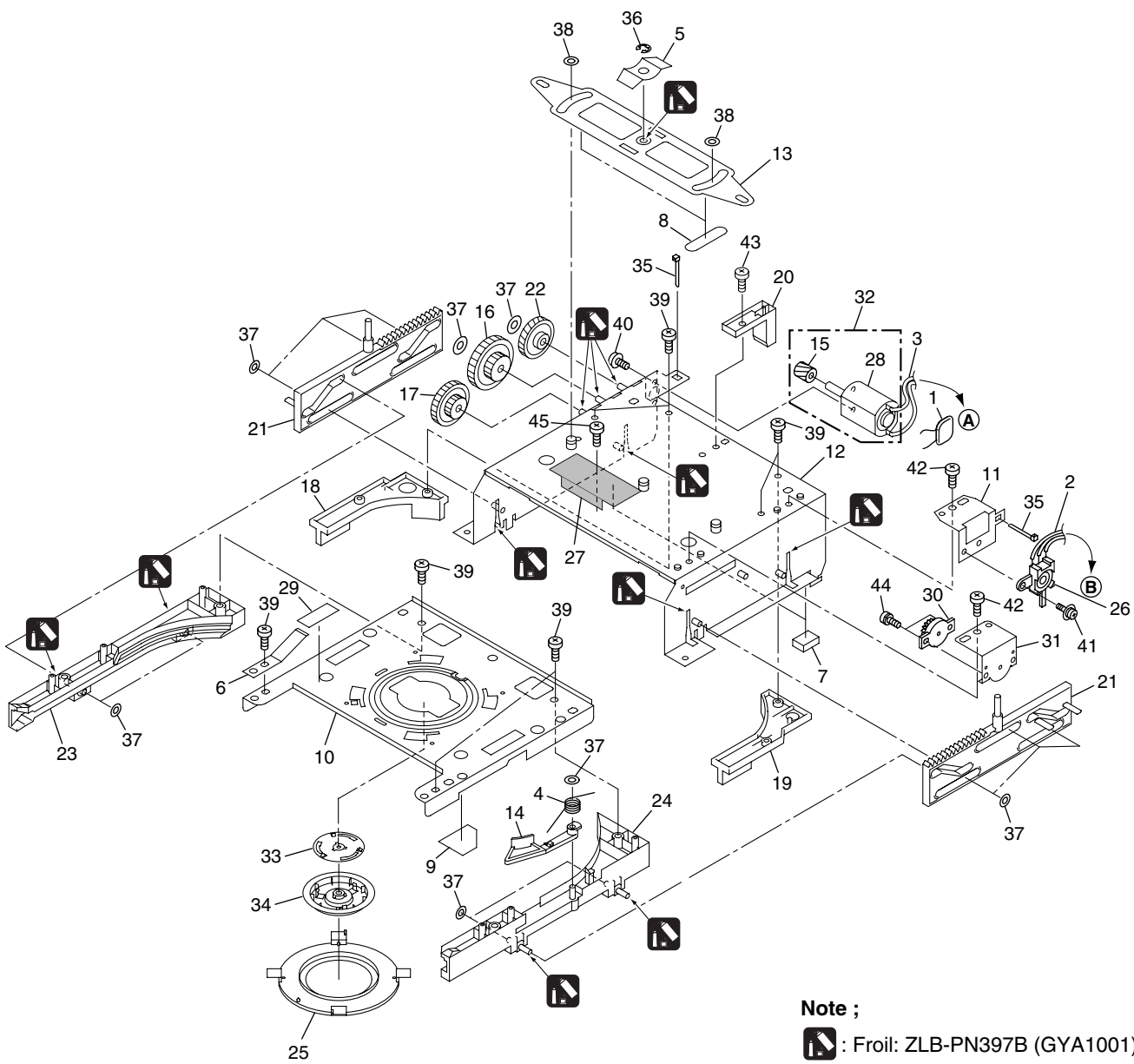
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CLAMP MECHANISM SECTION Parts List

Mark No.	Description	Part No.	
1	Capacitor (C1)	CFTLA224J50	
2	Connector Assy (3P)	DKP3281	A
3	Connector Assy	PF02PY-B15	
4	Disc Holder Spring	DBH1342	
5	Spring	DBK1134	
6	Earth Plate	DBK1139	
7	Cushion	DEB1355	
8	Slide Sheet	DEC2034	
9	Disc Holder Sheet	DEC2700	
10	Clamper Stay (R7)	DND1251	
11	Switch Bracket	DNF1700	B
12	Clamper Base	DNH2614	
13	Joint Arm	DNH2615	
14	CL Disc Holder	DNK3253	
15	Motor Gear	DNK3254	
16	CL Gear (B)	DNK3256	
17	CL Gear (C)	DNK3257	
18	Disc Holder (L)	DNK3289	
19	Disc Holder (R)	DNK3290	
20	Disc Stopper	DNK3291	C
21	Rack Plate	DNK3292	
22	CL Gear (A)	DNK3363	
23	Side Rack (L)	DNK3364	
24	Side Rack (R)	DNK3365	
25	Clamper Bracket (R7)	DNK4328	
26	Lever Switch	DSK1003	
27	Sheet	DED1143	
28	Motor	PXM1002	
29	Acetate Tape (G)	REH1010	
30	Damper Assy	VXA1153	D
31	Damper Bracket	DNF1701	
32	Clamp Motor Assy-S	DXX2336	
33	Clamper Plate R5	DNE1423	
34	Clamper R5	DNK4017	
35	Binder	ZCA-SKB90BK	
36	E Ring	YE30FUC	
37	Washer	WT26D047D050	
38	Washer	WT36D072D050	E
39	Screw	BPZ30P080FCU	
40	Screw	PMH20P040FTC	
41	Screw	PMH26P060FTC	
42	Screw	BBZ30P060FTC	
43	Screw	BBZ30P080FTB	
44	Screw	PMA20P050FCU	
45	Screw	BBZ30P040FTC	

1 2 3 4

2.4 TRAVERSE & MAIN UNI-S (DXX2554)

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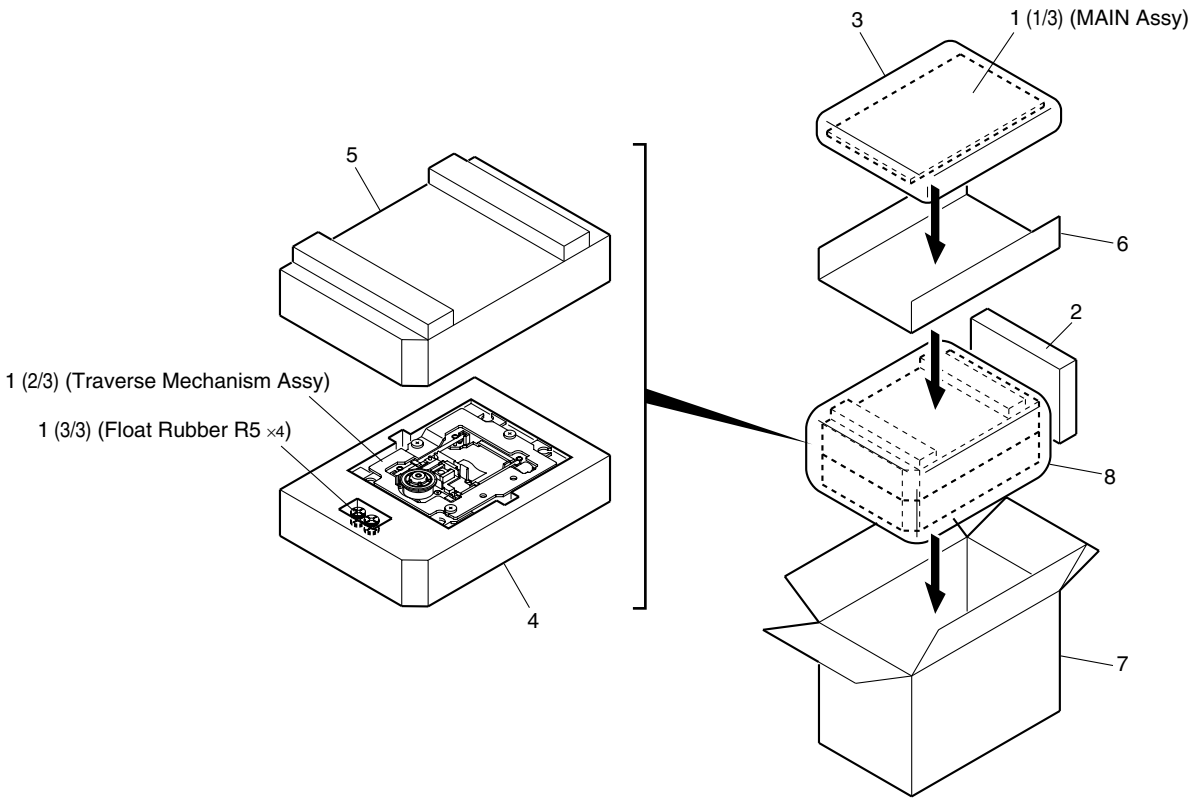
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TRAVERSE & MAIN UNIT-S (DXX2554) Parts List

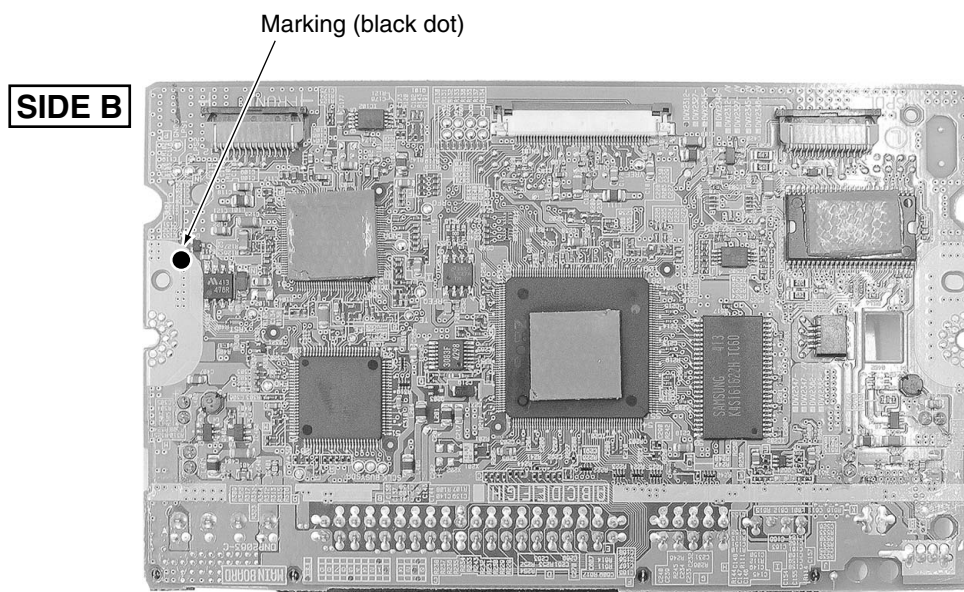
Mark	No.	Description	Part No.
	1	Traverse & Main Unit-S	DXX2554
	2	Spacer	DHA1567
	3	PCB Protect Sheet	DHA1568
	4	Pad (Bottom)	DHA1665
	5	Pad (Upper)	DHA1666
	6	Plate	DHC1060
	7	Packing Case	DHG2331
NSP	8	Bag	PHL1069

Distinction of the parts to be provided as service parts

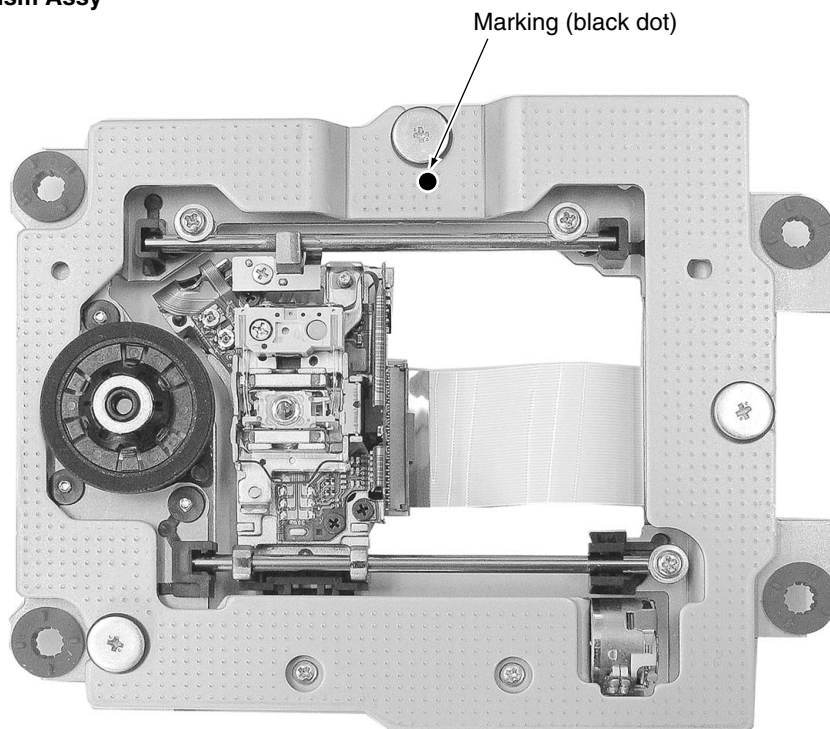
The Traverse & Main Unit-S, to be provided as service parts, have markings for distinction (black dot with a felt-tip marker) at the places shown in the photos below.

Be sure to replace both the Traverse Mechanism Assy and MAIN Assy when either needs to be replaced, because these parts were adjusted as a pair, and their operations were inspected as a pair before shipment.

MAIN Assy



Traverse Mechanism Assy



3. BLOCK DIAGRAM AND SCHEMATIC DIAGRAM

3.1 BLOCK DIAGRAM

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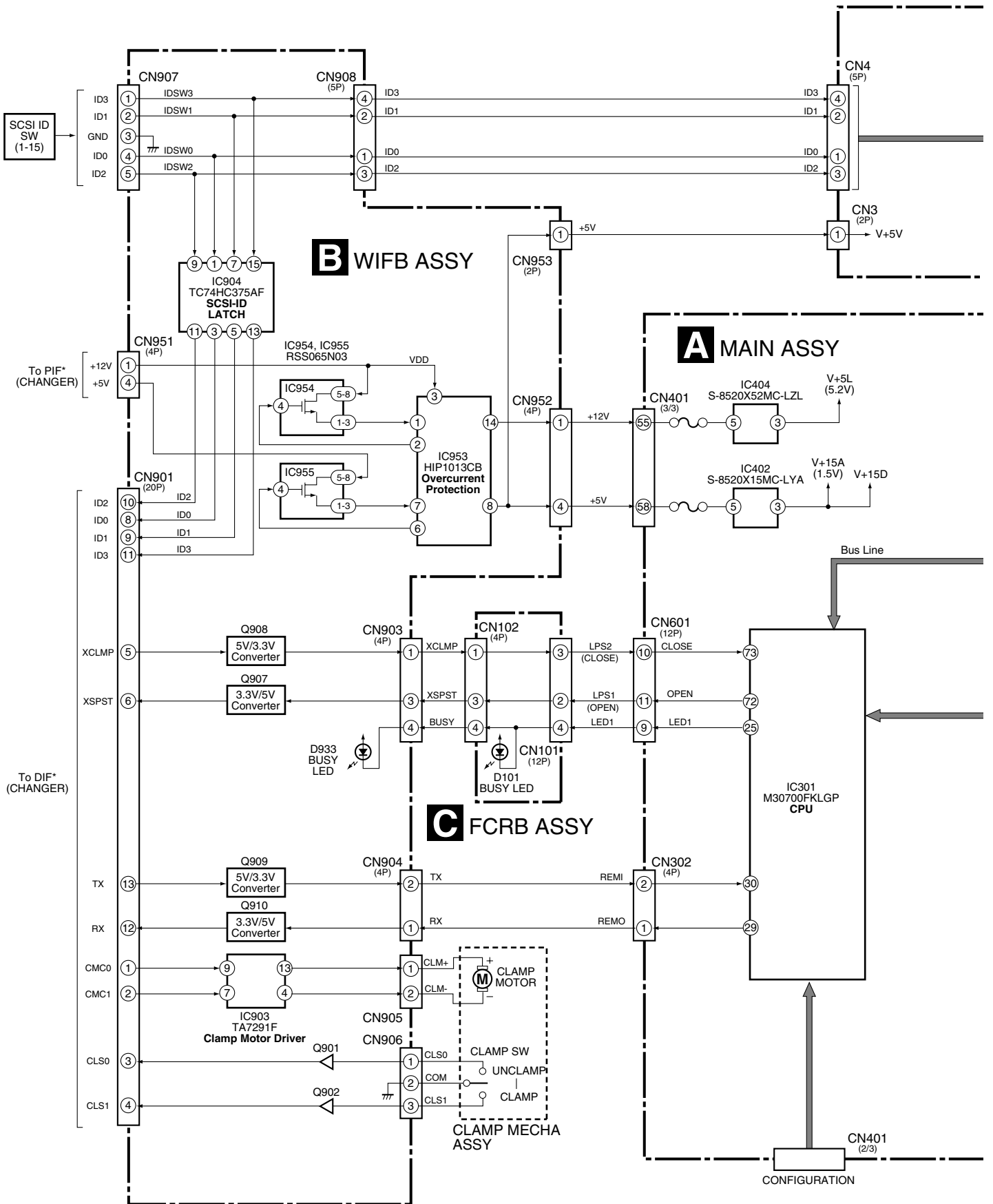
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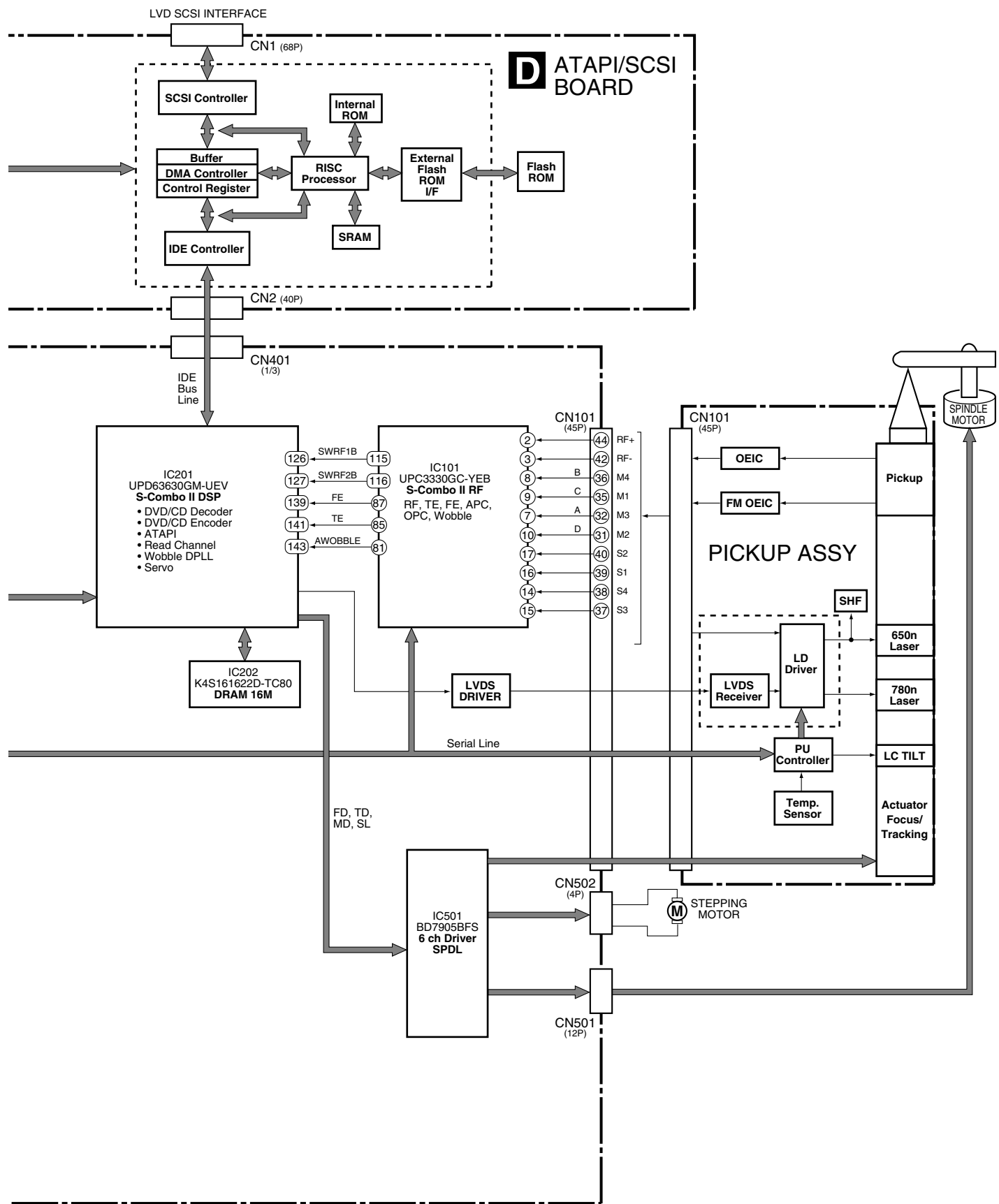
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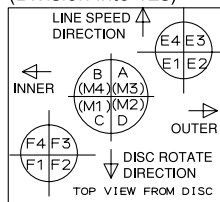


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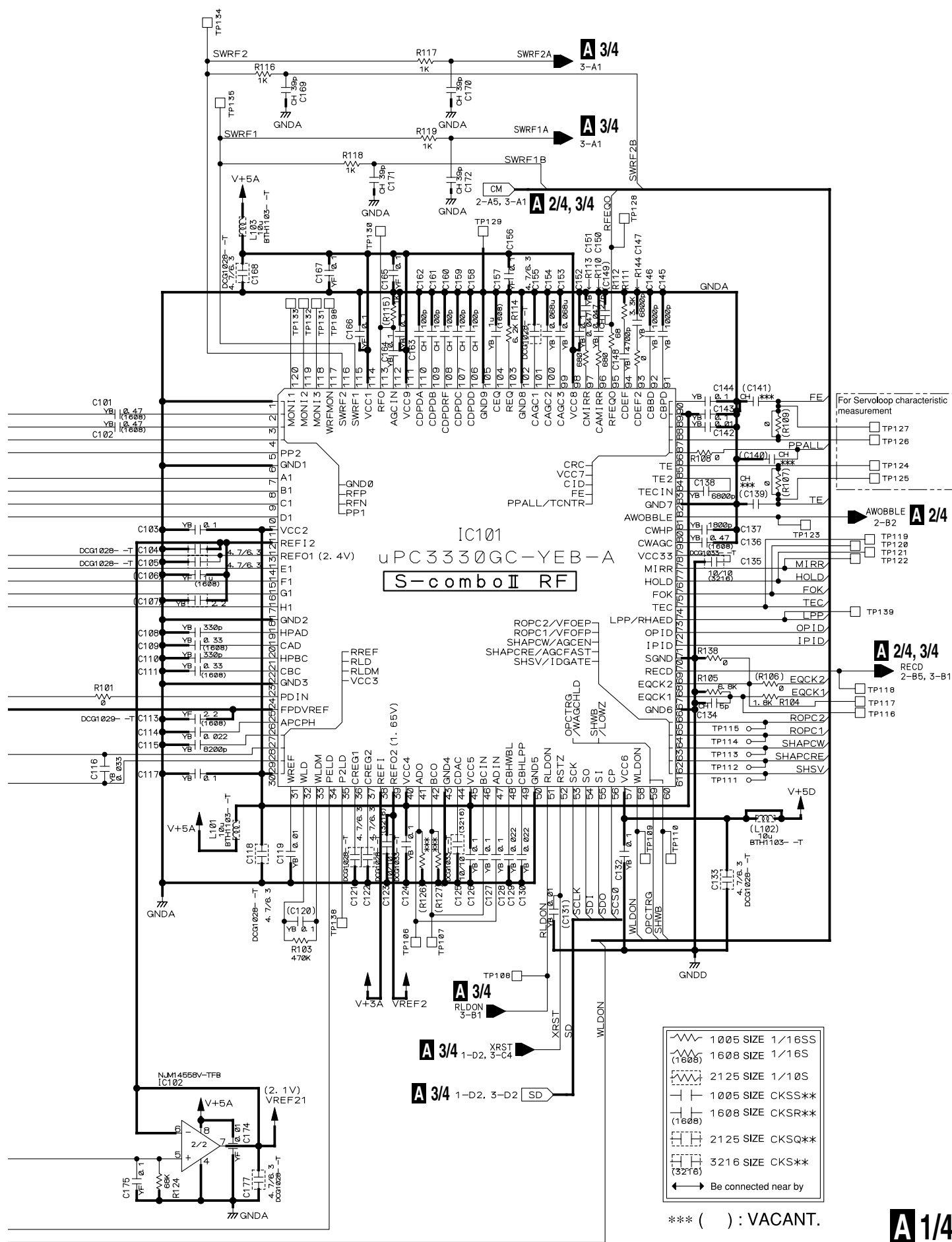


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A 1/4

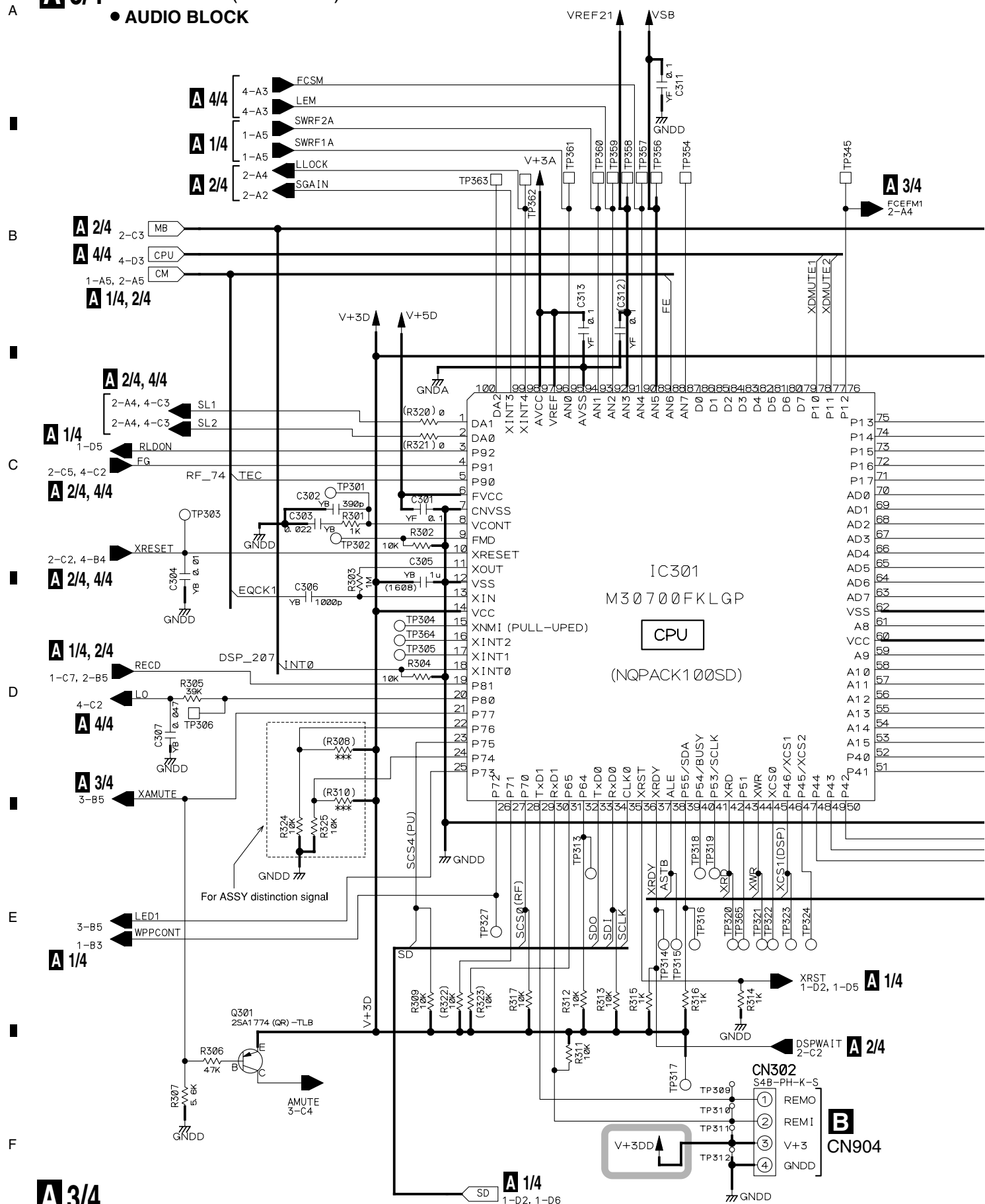


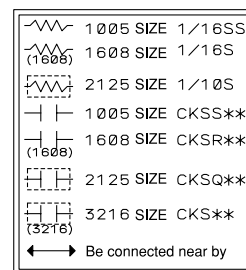


3.5 MAIN ASSY (3/4)

A 3/4 MAIN ASSY (DWX2312)

● AUDIO BLOCK



**A 3/4**



4



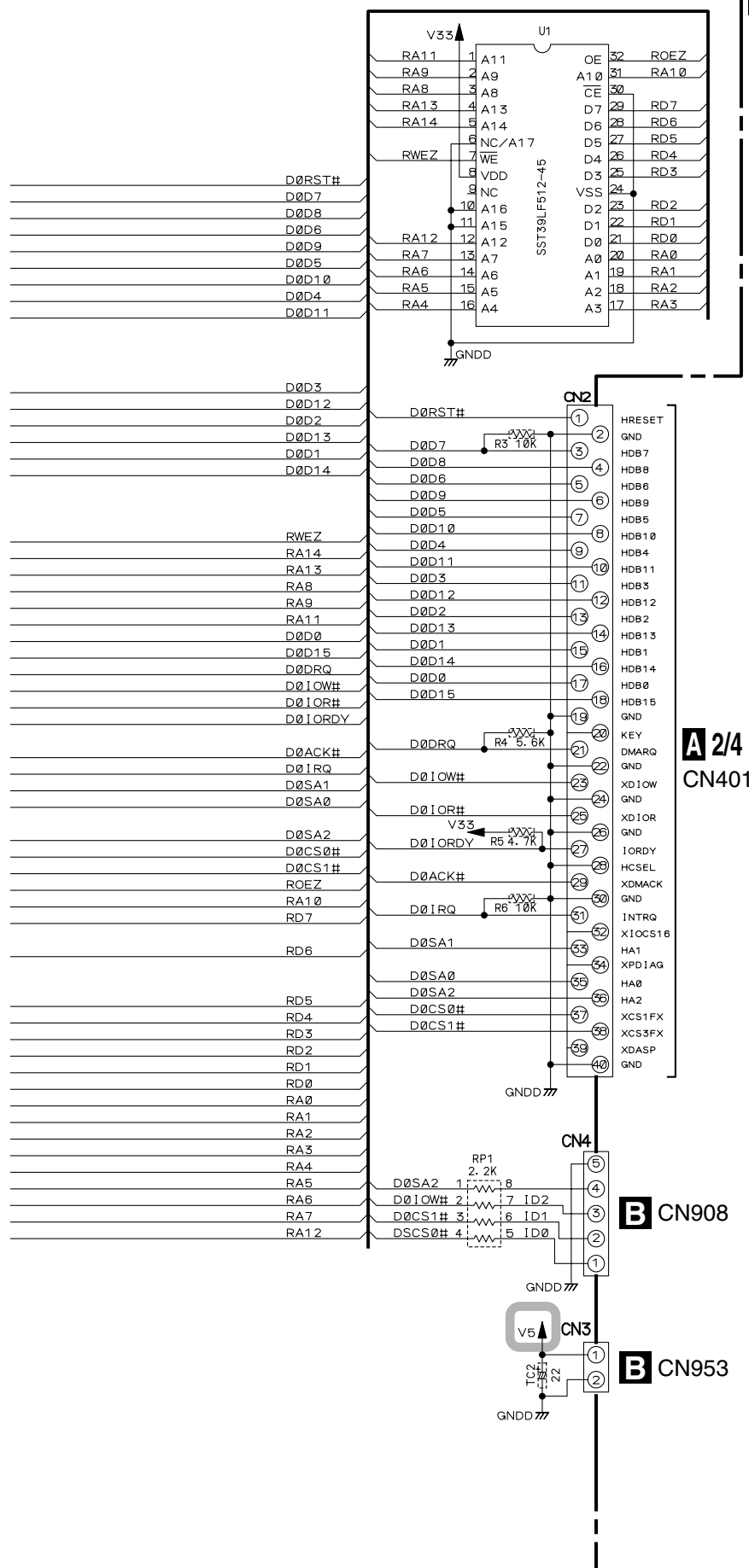


4



D ATAPI/SCSI BOARD (DWP1082)

This circuit diagram is merely for reference.
If a part needs replacement, replace the whole
assy. Parts are provided as an assy, not as
individual parts.



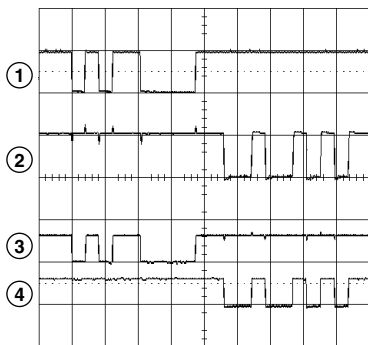
3.9 WAVEFORMS

Note : The encircled numbers denote measuring point in the schematic diagram.

B WIFB ASSY

• at Serial communication

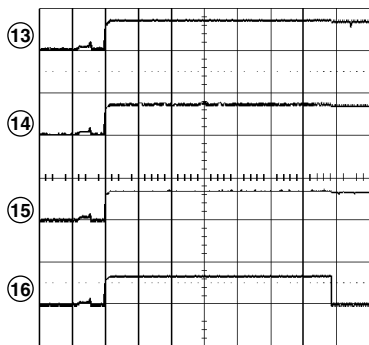
- ① CN901 - pin 13 (TX)
V: 5V/div. H: 5msec/div.
- ② CN901 - pin 12 (RX)
V: 5V/div. H: 5msec/div.
- ③ CN904 - pin 2 (TX)
V: 5V/div. H: 5msec/div.
- ④ CN904 - pin 1 (RX)
V: 5V/div. H: 5msec/div.



• SCSI-ID bridge side

(at power ON, SCSI ID setting = 0)

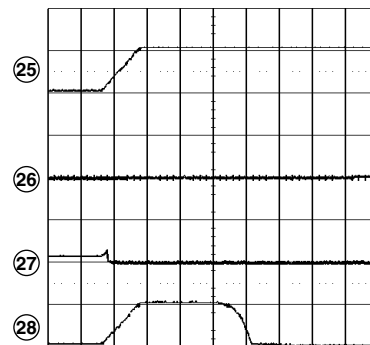
- ⑬ CN908 - pin 1 (ID0)
V: 5V/div. H: 5msec/div.
- ⑭ CN908 - pin 2 (ID1)
V: 5V/div. H: 5msec/div.
- ⑮ CN908 - pin 3 (ID2)
V: 5V/div. H: 5msec/div.
- ⑯ CN908 - pin 4 (ID3)
V: 5V/div. H: 5msec/div.



• SCSI-ID SW side, at ID0 to ID3 = L

(at power ON, SCSI ID setting = 15)

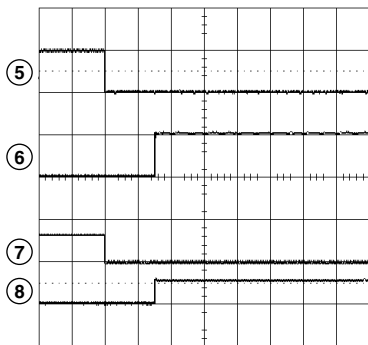
- ⑳ IC904 - pin 16 (+5V)
V: 5V/div. H: 5msec/div.
- ㉑ CN908 - pin 1 (ID0), 2 (ID1), 3 (ID2), 4 (ID3)
V: 5V/div. H: 5msec/div.
- ㉒ IC904 - pin 3 (ID0), 5 (ID1), 11 (ID2), 13 (ID3)
V: 5V/div. H: 5msec/div.
- ㉓ Q911 collector
V: 5V/div. H: 5msec/div.



• at Clamp-down

(Clamp-down finished → Disc rotate)

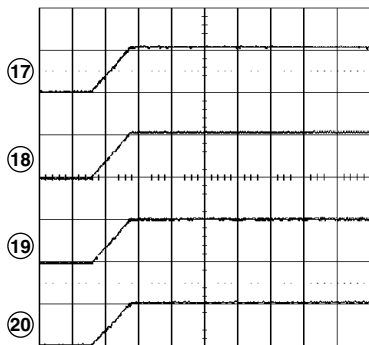
- ⑤ CN901 - pin 5 (XCLMP)
V: 5V/div. H: 50msec/div.
- ⑥ CN901 - pin 6 (XSPST)
V: 5V/div. H: 50msec/div.
- ⑦ CN903 - pin 1 (XCLMP)
V: 5V/div. H: 50msec/div.
- ⑧ CN903 - pin 3 (XSPST)
V: 5V/div. H: 50msec/div.



• SCSI-ID SW side

(at power ON, SCSI ID setting = 0)

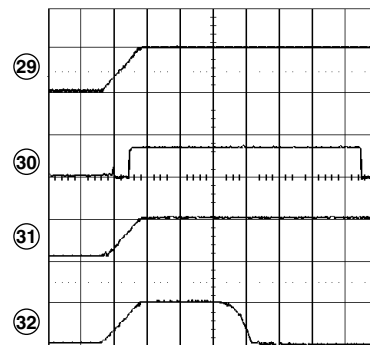
- ⑰ CN907 - pin 4 (ID0)
V: 5V/div. H: 5msec/div.
- ⑱ CN907 - pin 2 (ID1)
V: 5V/div. H: 5msec/div.
- ⑲ CN907 - pin 5 (ID2)
V: 5V/div. H: 5msec/div.
- ㉀ CN907 - pin 1 (ID3)
V: 5V/div. H: 5msec/div.



• SCSI-ID SW side, at ID3 = H

(at power ON, SCSI ID setting = 0)

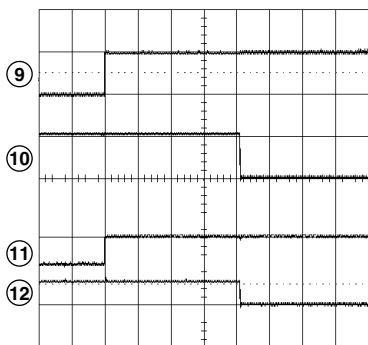
- ㉑ IC904 - pin 16 (+5V)
V: 5V/div. H: 5msec/div.
- ㉒ CN908 - pin 4 (ID3)
V: 5V/div. H: 5msec/div.
- ㉓ IC904 - pin 13 (ID3)
V: 5V/div. H: 5msec/div.
- ㉔ Q911 collector
V: 5V/div. H: 5msec/div.



• at Clamp-up

(Disc stopped → Clamp-up permission)

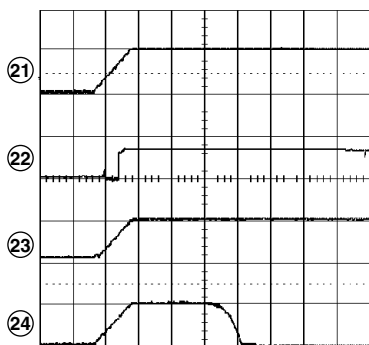
- ⑨ CN901 - pin 5 (XCLMP)
V: 5V/div. H: 1sec/div.
- ⑩ CN901 - pin 6 (XSPST)
V: 5V/div. H: 1sec/div.
- ⑪ CN903 - pin 1 (XCLMP)
V: 5V/div. H: 1sec/div.
- ⑫ CN903 - pin 3 (XSPST)
V: 5V/div. H: 1sec/div.



• SCSI-ID SW side, at ID0 to ID2 = H

(at power ON, SCSI ID setting = 0)

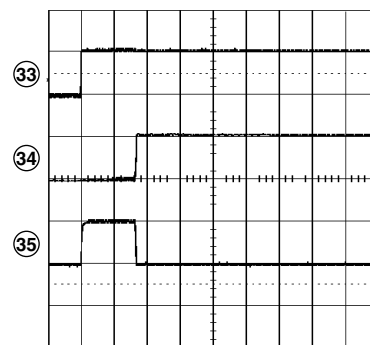
- ㉑ IC904 - pin 16 (+5V)
V: 5V/div. H: 5msec/div.
- ㉒ CN908 - pin 1 (ID0), 2 (ID1), 3 (ID2)
V: 5V/div. H: 5msec/div.
- ㉓ IC904 - pin 3 (ID0), 5 (ID1), 11 (ID2)
V: 5V/div. H: 5msec/div.
- ㉔ Q911 collector
V: 5V/div. H: 5msec/div.



• +5V and SNS2

(at power ON, 5V power I/O, normal output signal)


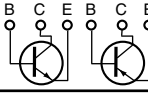

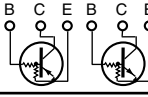

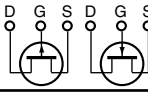

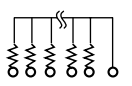


- ㉑ CN951 - pin 4 (+5V)
V: 5V/div. H: 1sec/div.
- ㉒ CN952 - pin 4 (+5V)
V: 5V/div. H: 1sec/div.
- ㉓ CN901 - pin 7 (SNS2)
V: 5V/div. H: 1sec/div.



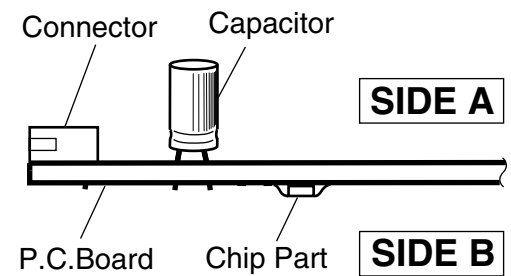
4. PCB CONNECTION DIAGRAM

NOTE FOR PCB DIAGRAMS :

1. Part numbers in PCB diagrams match those in the schematic diagrams.
2. A comparison between the main parts of PCB and schematic diagrams is shown below.

Symbol In PCB Diagrams	Symbol In Schematic Diagrams	Part Name
		Transistor
		Transistor with resistor
		Field effect transistor
		Resistor array
		3-terminal regulator

3. The parts mounted on this PCB include all necessary parts for several destinations.
For further information for respective destinations, be sure to check with the schematic diagram.
4. View point of PCB diagrams.



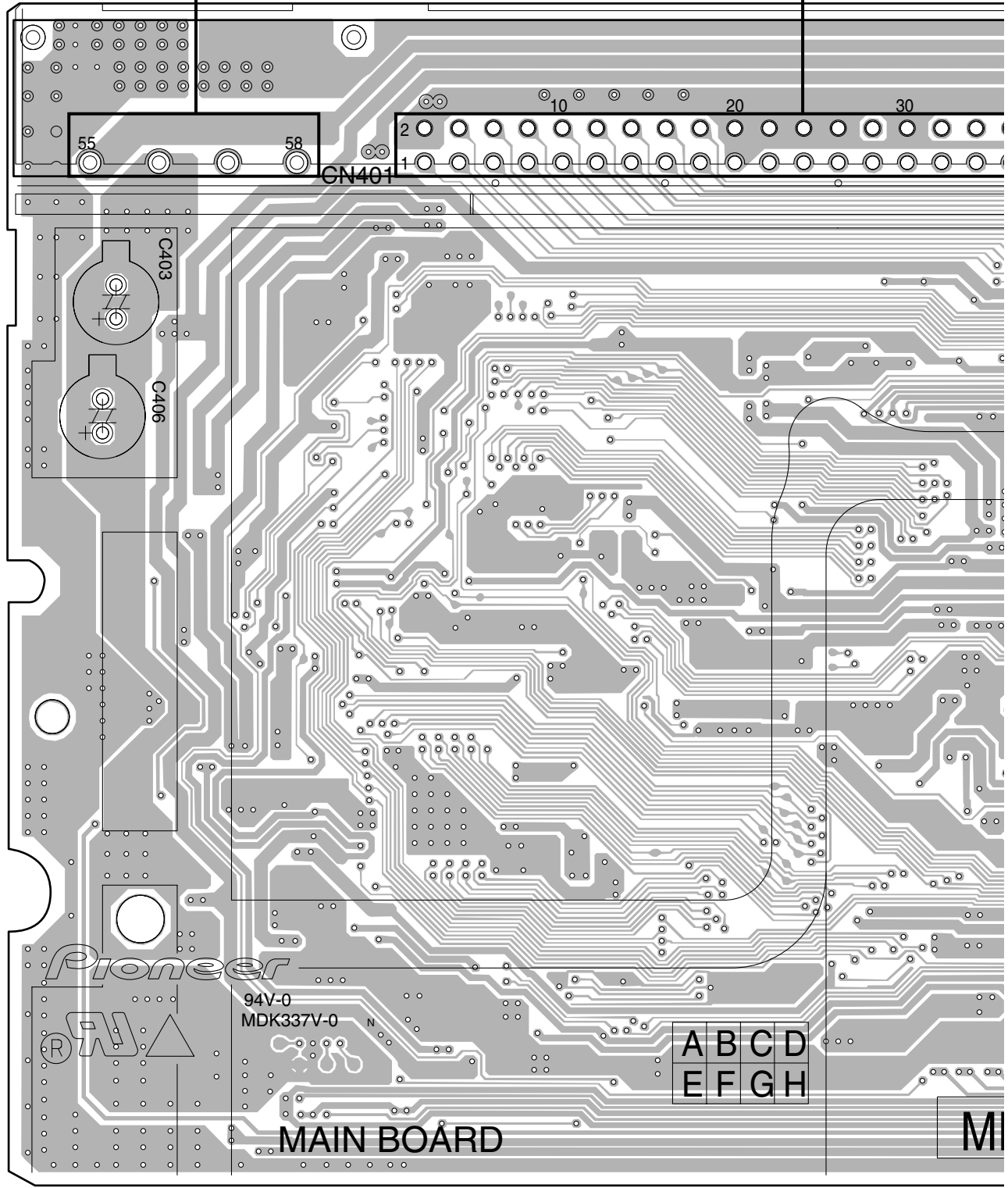
1 2 3 4

4.1 MAIN ASSY

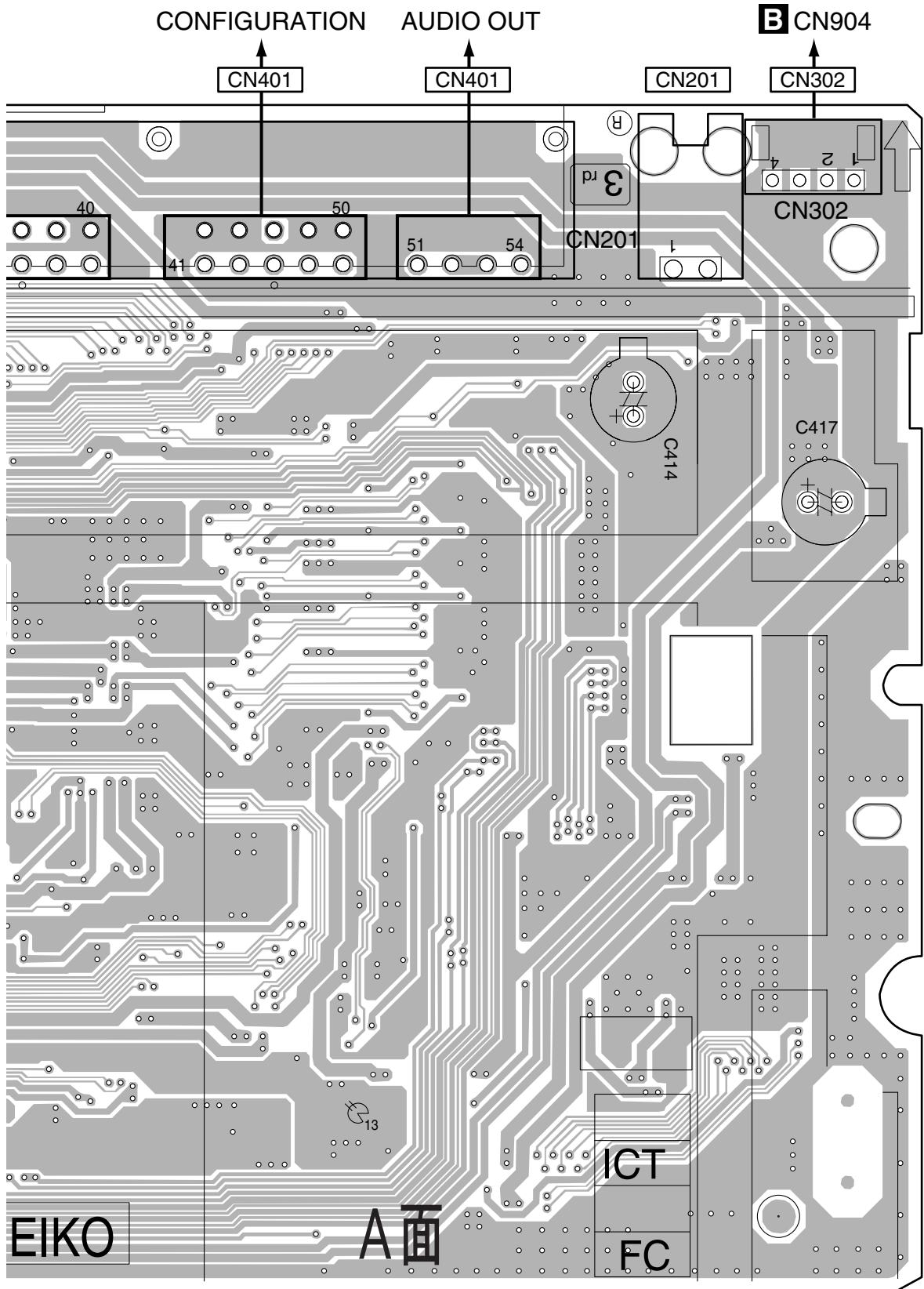
A
B
C
D
E
F

SIDE A

B CN952
CN401
A MAIN ASSY
D CN2
CN401



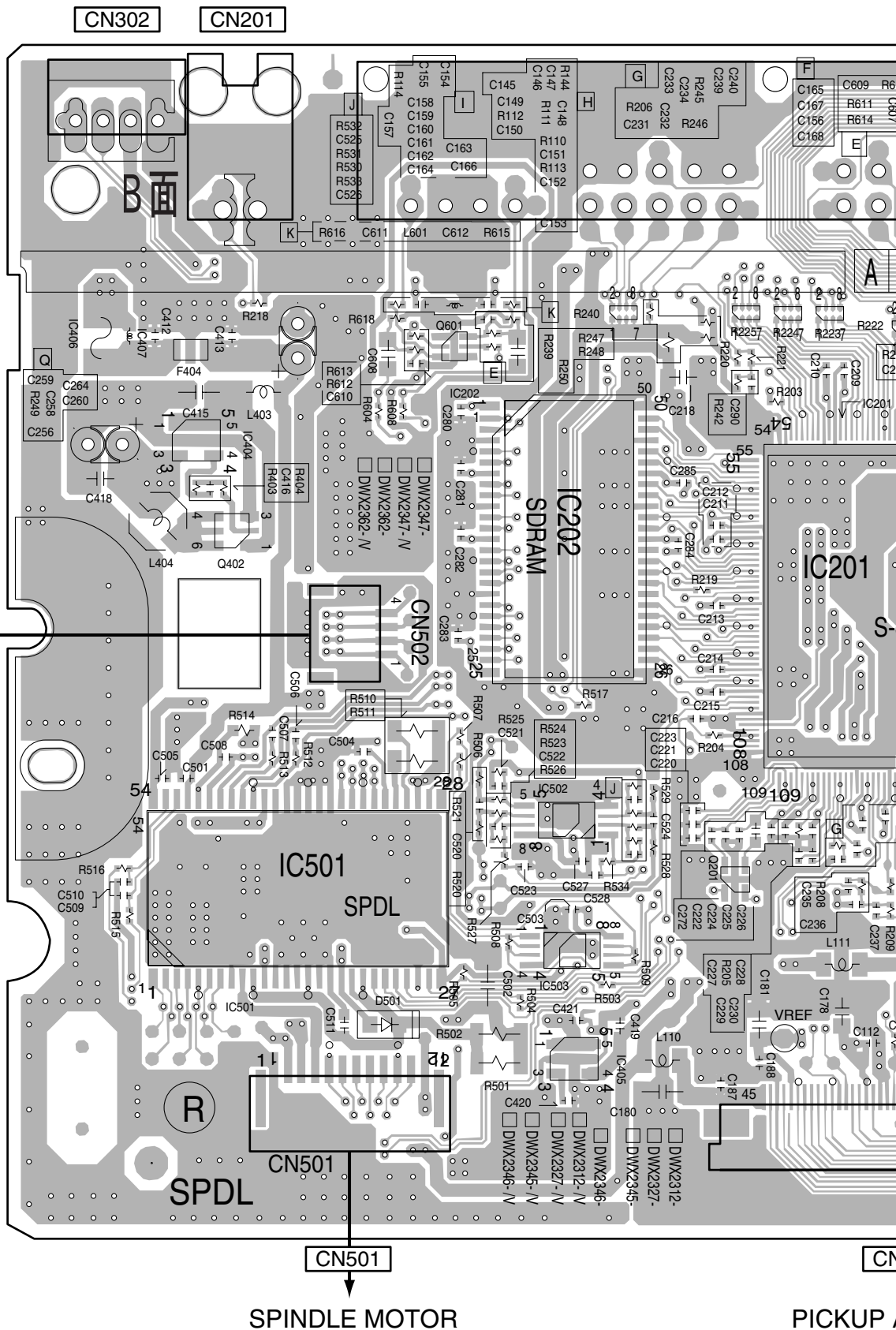
A

SIDE A

(DNP2063-C)

SIDE B

A MAIN ASSY



SPINDLE MOTOR

PICKUP

IC404

Q402

IC501

Q601

IC202

IC502

IC503

IC405

Q201

A

A

1

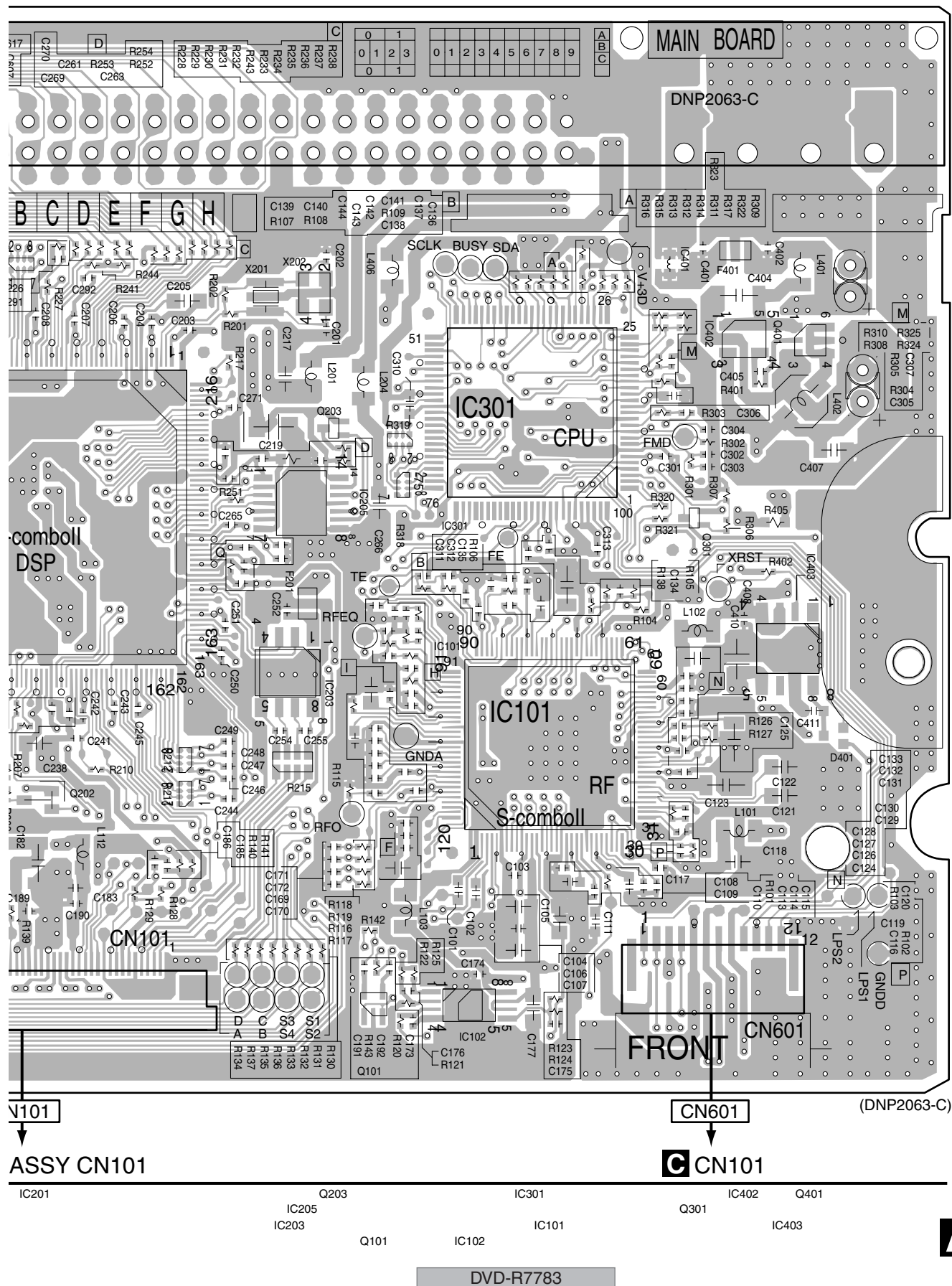
C

D

E

1

37

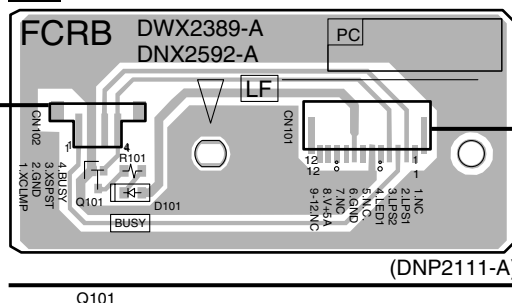


4.2 WIFB and FCRB ASSYS

SIDE A

SIDE A

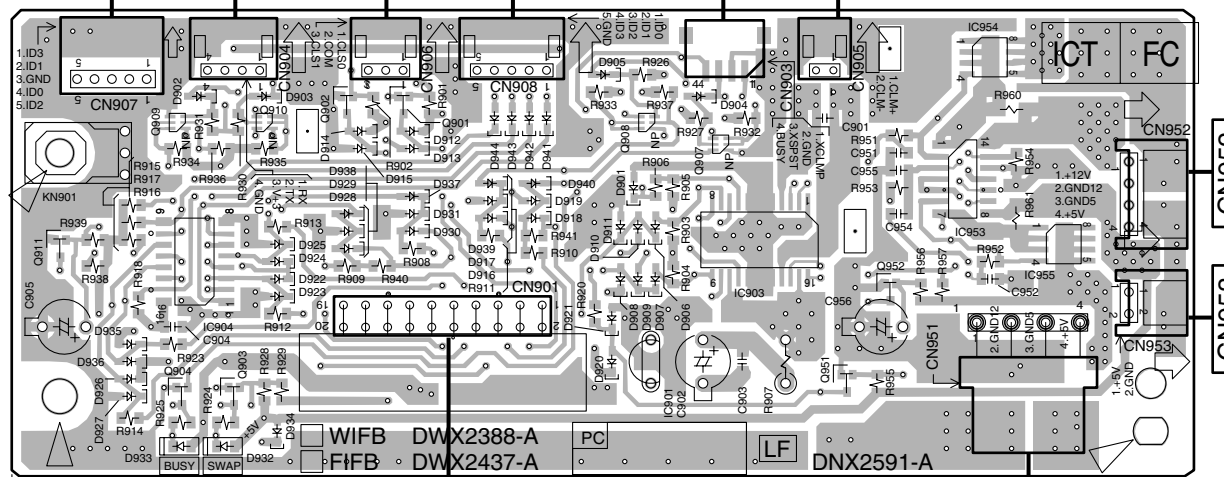
C FCRB ASSY



A CN601

SCSI ID SW **A** CN302
CLAMP SW **D** CN4

CLAMP MOTOR



B WIFB ASSY

DIF *
(CHANGER)

PIF *
(CHANGER)

D CN3 **A** CN401

Q911 Q903 Q902 Q901 Q908 Q907 Q952 IC954 IC955
IC904 IC901 IC903 Q951
Q904 Q903

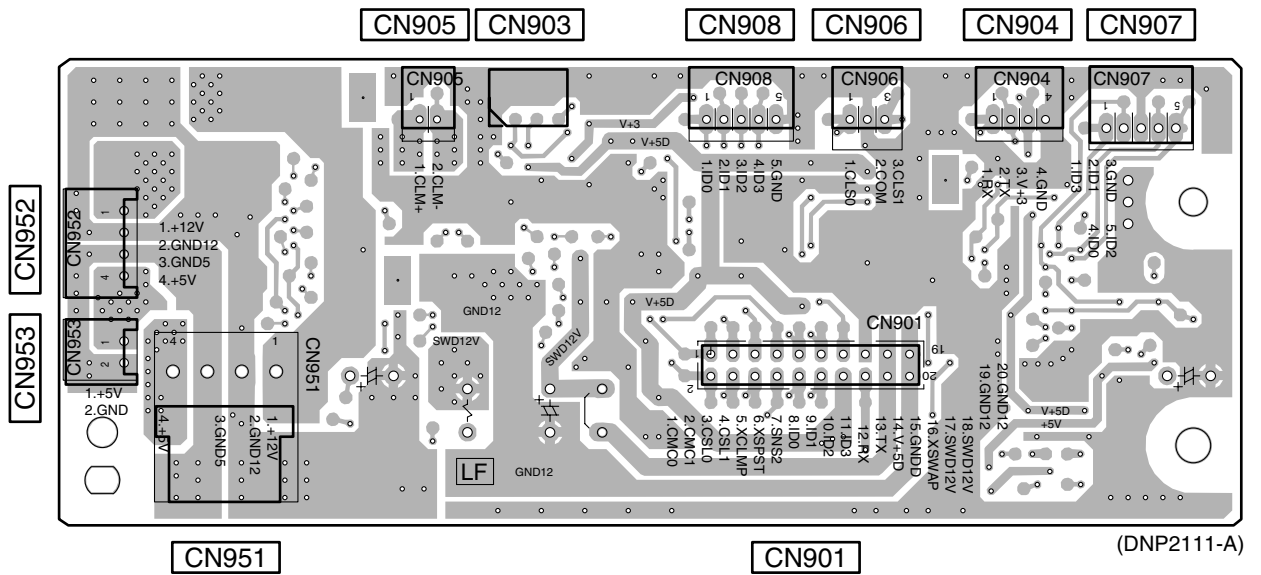
B C

SIDE B

SIDE B

A

B

B WIFB ASSY

C

D

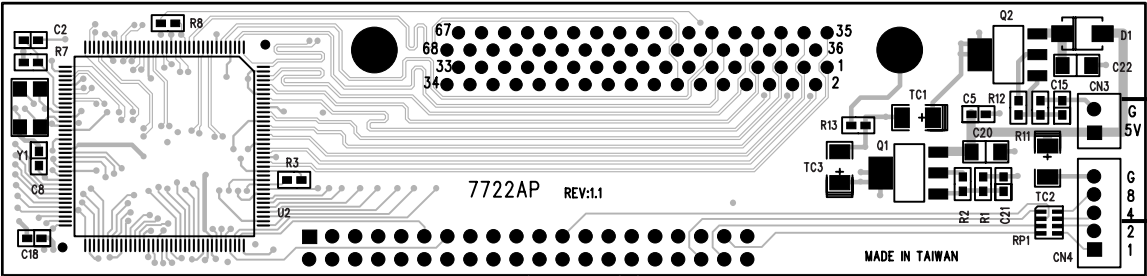
E

F

4.3 ATAPI/SCSI BOARD

D ATAPI/SCSI BOARD

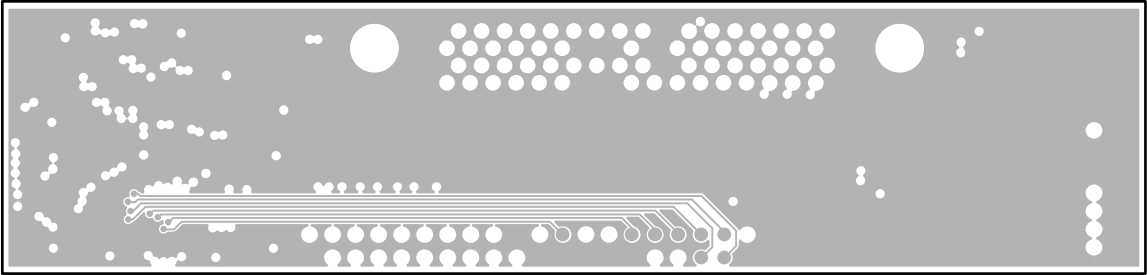
SIDE A



SIDE A

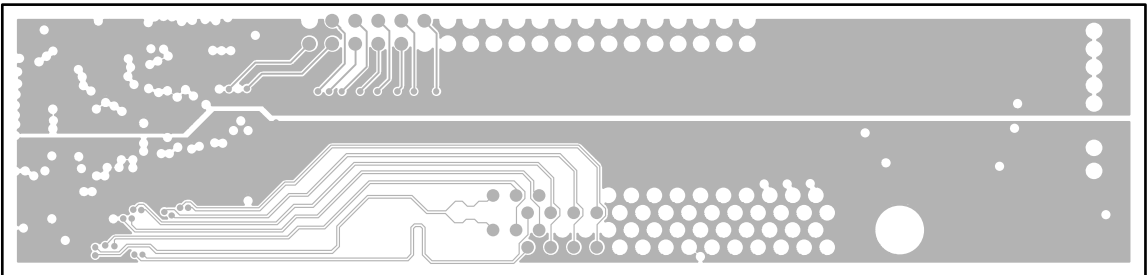
CN3
CN908
CN953

GND Layer



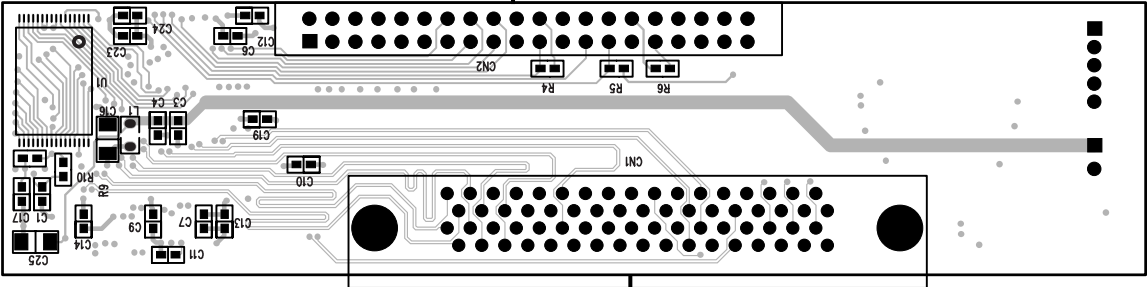
GND Layer

VCC Layer



VCC Layer

SIDE B



SIDE B

CN401

CN2

CN1

LVD SCSI INTERFACE

DVD-R7783

D

5. PCB PARTS LIST

NOTES: ● Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.
 ● The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
 ● When ordering resistors, first convert resistance values into code form as shown in the following examples.
 Ex.1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).
 $560 \Omega \rightarrow 56 \times 10^1 \rightarrow 561 \dots\dots\dots RD1/4PU \boxed{5} \boxed{6} \boxed{1} J$
 $47k \Omega \rightarrow 47 \times 10^3 \rightarrow 473 \dots\dots\dots RD1/4PU \boxed{4} \boxed{7} \boxed{3} J$
 $0.5 \Omega \rightarrow R50 \dots\dots\dots RN2H \boxed{R} \boxed{5} \boxed{0} K$
 $1 \Omega \rightarrow 1R0 \dots\dots\dots RS1P \boxed{1} \boxed{R} \boxed{0} K$
 Ex.2 When there are 3 effective digits (such as in high precision metal film resistors).
 $5.62k \Omega \rightarrow 562 \times 10^1 \rightarrow 5621 \dots\dots\dots RN1/4PC \boxed{5} \boxed{6} \boxed{2} \boxed{1} F$

Note *: Do NOT individually replace any part on the list other than one marked with an asterisk, to best maintain performance.

Mark No. Description Part No. LIST OF ASSEMBLIES

NSP	1..MAIN ASSY	DWX2312
NSP	1..WIFC UNIT	DWM2183
	2..WIFB ASSY	DWX2388
	2..FCRB ASSY	DWX2389
	1..ATAPI/SCSI BOARD	DWP1082

Mark No. Description Part No.

A MAIN ASSY SEMICONDUCTORS

IC501	BD7905BFS
IC205	BU2373FV
* IC401,IC407	CEK1285
IC203	DS90LV027ATM
IC202	K4S161622D-TC80
IC301	M30700FKLGP
IC403	MM1478RFBE
IC502	NJM12904V
IC102	NJM14558V
IC402	S-8520X15MC-LYA
IC404	S-8520X52MC-LZL
IC405	S-T111B25MC-OGK
IC101	UPC3330GC-YEB-A
IC201	UPD63630GM-UEV-A
Q301	2SA1774
Q401,Q402	CPH6702
Q203	DTA143ZE
Q601	UMX1N
D401	DAP202U
D501	RB551V-30

COILS AND FILTERS

L201,L204 CHIP COIL	BTH1101
L111 CHIP COIL	BTH1102
L101,L103,L110,L403,L406 CHIP COIL	BTH1103
L401 CHIP COIL	BTH1121
F201 EMI FILTER	CCG1159
F404 EMI FILTER	CCG1161

Mark No. Description Part No.

F401 CHIP EMI FILTER	DTF1106
L402,L404 POWER INDUCTOR (15U)	DTL1110

CAPACITORS

C205 (10/6.3V)	CCG1171
C158-C162	CCSSCH101J50
C290	CCSSCH181J50
C254,C255	CCSSCH220J50
C176,C416	CCSSCH221J50
C169-C172,C244,C509	CCSSCH390J50
C134	CCSSCH5R0C50
C510	CCSSCH620J50
C246-C249	CCSSCH8R0D50
C607,C608	CKSQYF475Z10
C419,C511	CKSRYB104K25
C305,C310	CKSRYB105K10
C157	CKSRYB105K6R3
C411	CKSRYB154K10
C109,C111	CKSRYB334K10
C101,C102,C136	CKSRYB474K10
C145,C146,C229,C230,C232	CKSSYB102K50
C306	CKSSYB102K50
C119,C142,C187-C189,C223	CKSSYB103K16
C304	CKSSYB103K16
C103,C112,C117,C124	CKSSYB104K10
C126-C128,C132,C143,C144	CKSSYB104K10
C152,C163,C164,C203,C204	CKSSYB104K10
C206-C215,C222,C226-C228	CKSSYB104K10
C231,C233,C234,C239	CKSSYB104K10
C242,C243,C245,C250-C252	CKSSYB104K10
C256,C258,C259,C261,C263	CKSSYB104K10
C265,C269,C270,C408,C421	CKSSYB104K10
C504,C505,C523,C525,C526	CKSSYB104K10
C528	CKSSYB104K10

Mark No. Description**Part No.****Mark No. Description****Part No.**

A

C609,C610
C137
C114,C129,C130,C224,C303
C108,C110,C405
C260

CKSSYB153K16
CKSSYB182K50
CKSSYB223K16
CKSSYB331K50
CKSSYB332K50

D908-D931,D934-D936

D906,D907,D941-D944
D933
D932
D901

1SS355

RB501V-40
SML-210MT
SML-210YT
UDZS7R5(B)

C116,C264
C302
C148,C220,C221
C150,C151,C307,C521,C522
C138,C147
C153,C154,C236

CKSSYB333K10
CKSSYB391K50
CKSSYB472K25
CKSSYB473K10
CKSSYB682K25
CKSSYB683K10

CAPACITORS

C902
C905,C956
C901,C903,C951,C952
C904,C954,C955

CEAT101M16
CEAT4R7M50
CKSQYB103K50
CKSQYF104Z50

B

C115
C174
C156,C165-C167,C173,C175
C240,C280-C285,C301,C311
C313,C401,C402,C412,C413

CKSSYB822K16
CKSSYF103Z50
CKSSYF104Z16
CKSSYF104Z16
CKSSYF104Z16

RESISTORS

⚠ R960,R961 (0.024 1/2W)
⚠ R907
Other Resistors

DCN1151
RD1/2VM4R7J
RS1/10S###J

C501,C503,C527
C104,C105,C118,C121,C122
(4.7/6.3V)
C133,C155,C168,C177,C178
(4.7/6.3V)

CKSSYF104Z16
DCG1028

DCG1028

C181,C217,C218,C238,C266
(4.7/6.3V)
C407,C418 (4.7/6.3V)
C113,C183 (2.2)
C123,C125,C135,C180,C182 (10/10V)

DCG1028

DCG1028

DCG1029

DCG1033

C

C404 (10/10V)
C219,C410 (22/6.3V)
C415,C502 (10/16V)
C403,C406,C414,C417 (220/16V)

DCG1033

DCH1130

DCH1165

DCH1172

OTHERS

* CN907 MT CONNECTOR 5P
* CN951 4P CONNECTOR
PCB BINDER
* CN901 CONNECTOR POST
* CN905 CONNECTOR 2P

173979-5
B4PS-VH
DEF1015
FAP-20-08#2-0BF
S2B-PH-K-S

* CN906 CONNECTOR 3P
* CN904 CONNECTOR 4P
* CN903 4P CONNECTOR
* CN908 CONNECTOR 5P
KN901 WRAPPING TERMINAL

S3B-PH-K-S
S4B-PH-K-S
S4B-ZR-SM3A
S5B-PH-K-S
VNF1084

**FCRB ASSY (DWX2389)
SEMICONDUCTORS**

Q101
D101

DTC124EUA
SML-210MT

RESISTORS

All Resistors

RS1/10S###J

OTHERS

* CN102 CONNECTOR 4P
* CN101 12P FFC CONNECTOR

B4B-ZR-SM3
DKN1312

D ATAPI/SCSI BOARD

ATAPI/SCSI BOARD no service part.

6. ADJUSTMENT

- There is no information to be shown in this chapter.

**B WIFB ASSY
SEMICONDUCTORS**

⚠ IC953
⚠ IC901
⚠ IC954,IC955
⚠ IC903
IC904

HIP1013CB
ICP-N20
RSS065N03
TA7291F
TC74HC375AF

F

Q903
Q901,Q902,Q904,Q911
Q951,Q952
Q907-Q910

2SC4081
DTC124EUA
DTC124EUA
UMH1N

7. GENERAL INFORMATION

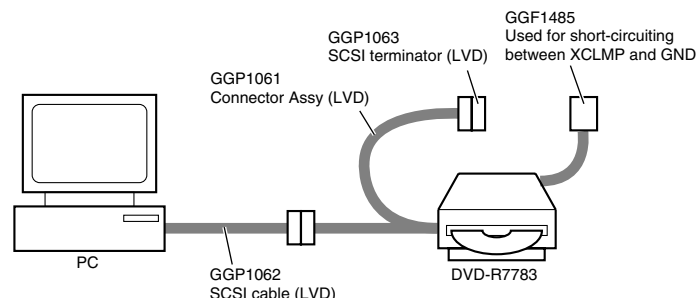
7.1 DIAGNOSIS

7.1.1 OPERATIONAL DIAGNOSIS PROGRAM

1. Items required for operation checks

- GGS1030: Operation check program
(Diagnose5.exe, chgpio32.dll, cdiagp32.dll)
- GGP1061: Connector Assy (LVD)
- GGP1062: SCSI cable (LVD)
- GGP1063: SCSI terminator (LVD)
- GGF1485: Special device for RS-232C communication
for the changer drive
(used for short-circuiting XCLMP)

■ Connections when operations of the DVD-R7783 alone are checked



2. Outline

Diagnose5 is application software for operation diagnoses of Pioneer DVD changers for use with 100, 500, and 700 DVDs. Diagnosable functions are disc movement, the read function, and the write function. Rewriting of the serial number, acquisition of internal information, and upgrading of the firmware are also possible. When "diagnoses of all drives" is executed, diagnoses of disc movement and the read function, and acquisition of internal information are executed, in that order, and the results are recorded in a log.

Diagnose5 supports one SCSI bus and one changer. It must be used in an environment where no device other than a changer and the drives in it is connected on the SCSI bus.

Supported OS: Windows NT4.0/95/98/Me/2000

Note: The ATAPI drive is not supported.

3. Composition of the software

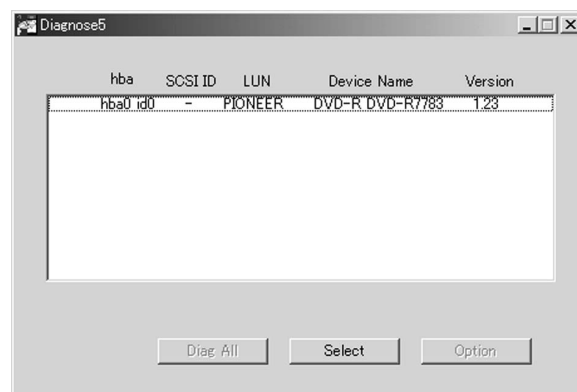
Diagnose5 is composed of one executable file (Diagnose5.exe) and two dll files (chgpio32.dll and cdiagp32.dll). With Windows NT, it is necessary to install the ASPI manager (wnaspi32.dll) beforehand. For installation, copy an executable file (version 2.900 or later) and the dll file in the same folder on the PC.

Note:

Set "automatic notification of insertion" for the drive to OFF. If it is set to ON, the program may not operate properly. If a drive with this setting set to ON is connected, a message asking whether to change this setting to OFF is displayed when Diagnose5 is started up. In such a case, select "Yes" then restart your PC.

4. How to use

Main screen (when no changer is connected)

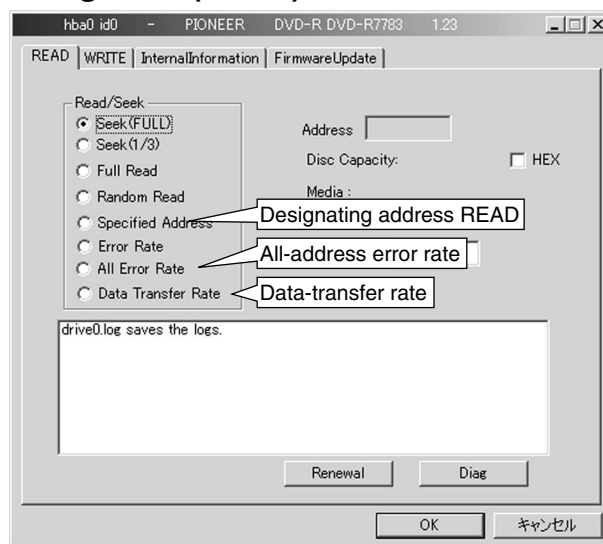


Select button

When this button is clicked on, the diagnosis menu corresponding to the drive selected in the list box is displayed.

Note: The ATAPI drive name is displayed on the screen, depending on the version of the ASPI manager, but the ATAPI drive is not supported.

5. Diagnosis (READ)



Diagnosis button

Selected diagnosis items are executed. If an error occurs, error content will be displayed in the list box, and the diagnosis in progress will be stopped. The results of diagnosis and error content will be displayed on the screen, and they are also recorded in a file "driven.log" that is created for each drive, where n is the drive number.

Update button

(useable only when no changer is connected)

To update disc data for the loaded disc. Click on this button after a disc is loaded or unloaded manually.

Address

- A When "Designating address" is selected, designate the address to be read. The figure that can be entered is up to the maximum address number minus 32, as data for 32 addresses are read at one time.
Maximum address: The maximum address number of the loaded disc

Diagnosis items

- Seek(FULL):** After the innermost and outermost tracks are sought for a designated number of times, the maximum time and average time are displayed, and the results are determined.
- B **Seek(1/3):** After one-third and two-thirds points of the designated address are sought for a designated number of times, the maximum time and average time are displayed, and the results are determined.
- All-address read:** All addresses are read for 64 Kbytes. If an address is designated in "Address," all addresses from that address to the maximum address are read.
- Random read:** After a random address is read for a designated number of times, the average time is displayed, and the results are determined.
- Designated address read:** An address designated in "Address" is read for a designated number of times.
- C **Error rate:** The error rate is measured and displayed.
- All-address error rate:** The error rate for the whole disc is measured.
- Data-transfer rate:** The data-transfer rate is measured. This is not used for the diagnosis of the DVD-R7783.

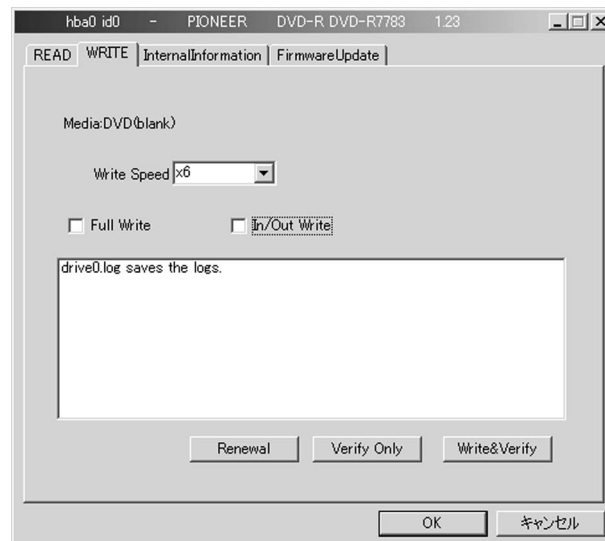
Results

- Accurate seek (read) time cannot be measured, because unrelated tasks are executed in the Windows environment while this application is operating. When the results are determined, therefore, the margins are considered around the standard thresholds.
- D **GOOD:** The result is within the standard threshold at shipment.
- OK:** The result is within a proper margin although it exceeded the standard threshold at shipment.
- NG:** The result is outside the standard threshold and a proper margin.

Notes:

1. Reading is executed by 64 Kbytes.
2. If a linked part on a disc on which data are written in multisession and multitrack is read, a media error or a hardware error (error code: 3-xx-xx or 4-xx-xx) is generated.
- E

6. Diagnosis (WRITE)



Note: A blank DVD-R disc is necessary for a writing diagnosis. A disc that has been used for a writing diagnosis cannot be reused.

Writing speed

Designate a speed at which data are to be written on the disc. The maximum writing speed for the disc is selected as default.

All-address writing

After executing OPC 20 times, a writing test will be executed. If a check mark is not placed for this item, 64 Mbyte of data are written on the disc, then finalizing is executed. If a check mark is placed, 64 Gbyte of data are written on the disc, then finalizing is executed. Using a laptop computer, it takes about 100 minutes for all-address writing.

Writing at the innermost and outermost tracks

After executing OPC 20 times, a writing test will be executed. If a check mark is placed for this item, 32 Mbyte of data are written at the innermost and outermost tracks of the disc, then the error rates of the written parts are measured.

Update button

(can be used only when no changer is connected)

To update disc data for the loaded disc. Click on this button after a disc is loaded or unloaded manually. Before executing a writing test, check that the medium is set to "DVD (blank)."

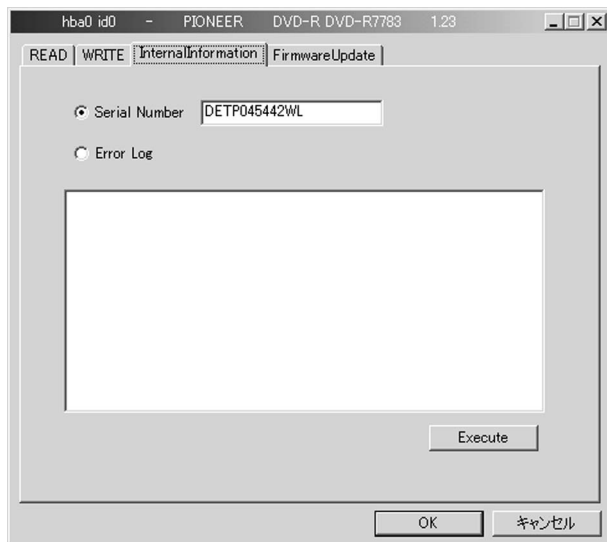
Write & Verify button

Writing is executed with the settings designated for a disc then verification is executed after writing is completed. The results of a diagnosis and error content are displayed in the list box, and they are also recorded in a file "driven.log" for each drive, where n is the drive number.

Verification-only button

Verification is executed for a disc on which writing is completed. This function cannot be used for a disc on which writing was executed at the innermost and outermost tracks.

7.1.2 REWRITING SERIAL NO.

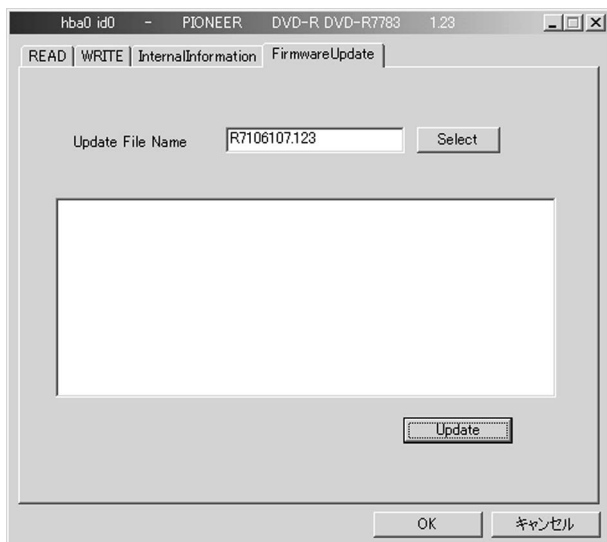


The serial number of the drive can be rewritten by selecting Serial Number.

Notes:

1. Rewrite all data (production date, production site, specification code) of the serial number.
2. After serial number rewriting is executed, the serial number is read from the drive and displayed. Then, if a new serial number is displayed, rewriting was successfully finished.

7.1.3 FIRMWARE VERSION UP OF MAIN ASSY



Necessary file for version upgrade:

R7106107.***: Firmware file (***: Version number)

Procedures

Designate the firmware file by clicking on the Select button. Click on the Update button to start upgrading the version. Version upgrade is finished (about 40 seconds) when "Version upgrade completed" is displayed.

Note:

Be sure to set "Automatic notification of insertion" of the drive to OFF. If it is set to ON, version upgrade is likely to fail.

7.1.4 HOW TO CONFIRM AND UPDATE THE FIRMWARE VERSION OF THE ATAPI/SCSI BOARD

■ Items required

- GGS1067 (updater 3.2.3.6.exe)

1. Preparations

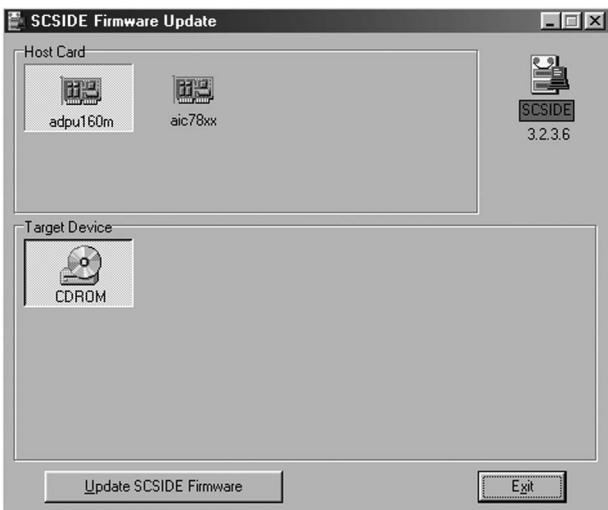
Decompress Updater. Execute the SETUP.EXE file in the decompressed folder. Install the program, following instructions on the display.

2. How to confirm the firmware version

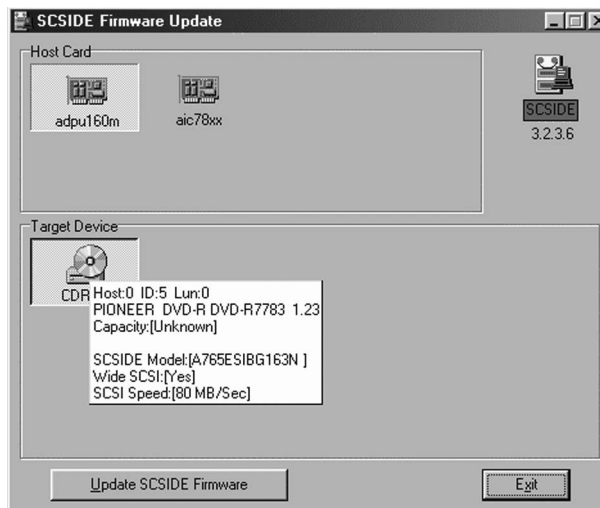
Start the installed SCSIDE Firmware Utility. The following screen is displayed:



Click once on the icon for the SCSI card to which the DVD-R7783 is connected. The following screen is displayed:



Move the mouse pointer on the icon of the CD-ROM. The following screen is displayed:



SCSIDE model: [A765ESIBG163N]: The last four alphanumeric (163N, in this case) indicate the version number.

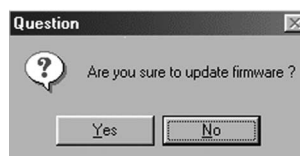
3. How to update the firmware

For updating the firmware, copy the "slvd****.bin" (****: Version No.) file onto the local PC.

Click on the "SCSIDE firmware update" button. The file selection box appears:



Select "slvd****.bin" then click on the "Open" button. The following box appears.



Click on the "Yes" button. After a while, if the following message box appears, updating is completed:



Turn off the drive and the PC then turn them back on. Following the steps for checking the firmware version, confirm if the firmware version has been updated.

7.1.5 ACQUISITION OF THE ERROR HISTORY

If "Error Log" is selected and executed, internal information, such as error logs, is displayed on the screen. This internal information is also recorded in a file "driven.log," where n is the drive number.

• Description of error logs

(Up to four error logs are displayed at one time.)

Items ① Execute Task, ② Endeco Cmd, ③ Error Code, ④ Error Address, and ⑤ Error Occurred Time in an error log tell you the content of the error.

Identify=ff

Aging No.=0x0f Aging pointer=0x00

Controller Cmd=0x07 Controller step=0x03

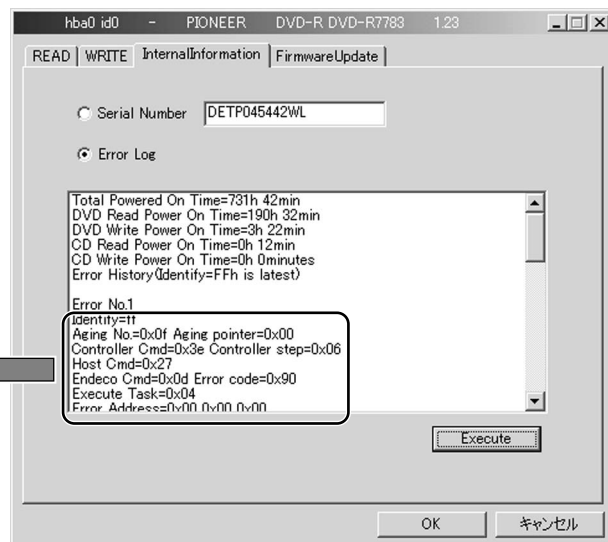
Host Cmd=0x62

Endeco Cmd=0x04 ← ② Error code=0x0b ← ③

Execute Task=0x02 ← ①

Error Address=0x22 0x00 0x00 ← ④

Error Occurred Time=17h 36min ← ⑤



First check item ① Execute Task. It tells you with which command for a task an error was generated.

The issued command code is indicated in ② Endeco Cmd.

Then check item ③ Error Code. It tells you where the error was generated.

In ④ Error Address, the address at which the error was generated is indicated as a Logical Block Address (LBA).

In ⑤ Error Occurred Time, the accumulated power-on time when the error was generated is indicated.

① Execute Task

01h: An error was generated in the Mecha-con.

02h: An error was generated in the decoder.

04h: An error was generated in the DVD encoder.

08h: An error was generated in the CD encoder.

10h: An error was generated in the controller.

② Endeco Cmd

→ See "Table 1 (P49): Mecha-con Command".

→ See "Table 3 (P50): Decoder Command".

→ See "Table 5 (P51): DVD encoder Command".

→ See "Table 7 (P52): CD encoder Command".

→ See "Table 9 (P53): CD Controller Command".

③ Error Code

→ See "Table 2 (P49): Mecha-con Error".

→ See "Table 4 (P50): Decoder Error".

→ See "Table 6 (P51): DVD encoder Error".

→ See "Table 8 (P52): CD encoder Error".

→ See "Table 10 (P56): Controller Error".

Note:

Normally a command and error are issued from the same device. However, for a mechanical error during recording, the command is issued from the CD/DVD encoder, but the error code is issued from the mechanical-control computer.

Meaning of each item

Item	Meaning
Identify	Indicates which is the latest error: The latest error is indicated as FFh. After an error was generated, if the power was turned off then back on and an error was generated again, the previous error is changed to BBh, and the latest error is indicated as FFh. After an error was generated, if the power was not turned off but an error was generated again, the previous error is changed to 00h, and the latest error is indicated as FFh.
Aging No.	Indicates in which aging mode the unit was operating. (See Table 11.)
Aging pointer	Indicates which operation was being executed in the aging cycle. No indication is displayed for Normal mode.
Controller Cmd	Indicates the mode the controller was in.
Controller step	Indicates the step of the mode the controller was executing. Details on this item are not described in this manual.
Host Cmd	Indicates an intermediate command that was issued from the host. (See Table 12.) No indication is displayed for aging.
Endeco command	Indicates a command that was issued to the encoder, decoder, or mechanical-control computer.
Error code	Indicates an error code that was returned from the encoder, decoder, or mechanical-control computer.
Execute task	Indicates for which task the error code was returned.
Error address	Indicates the address where the error was generated. There may not be an error address.
Detail	Indicates the details of the error. Details on this item are not described in this manual.
ErrorOccurredTime	Indicates the accumulated power-on time when the error was generated.

EX:

```

Identify=ff                // Latest error
Aging No.=0x0f Aging pointer=0x00 // Normal mode
Controller Cmd=0x07 Controller step=0x03 // Read
Host Cmd=0x62              // Read
Endeco Cmd=0x04 Error code=0x0b // DVD User Data Read & Decode, Read Time Out
Execute Task=0x02           // An error was generated in the decoder.
Error Address=0x22 0x00 0x00 // Address where the error was generated: LBA 220000h
Error Occurred Time=17h 36min // Accumulated power-on time when the error was generated
                              (in this case, 17 hours 36 minutes)

```

In the above example,

- ① The error was generated in the decoder.
- ② The command being executed when the error was generated is "DVD User Data Read & Decode."
- ③ The status when the error was generated is "Read Timeout."
- ④ The address where the error was generated is "220000h."
- ⑤ The accumulated power-on time when the error was generated is 17 hours 36 minutes.

Details on error logs

Table 1 Mecha-con Command

Command Code	Remarks
0x00	NOP
0x01	Initialize
0x03	Unload
0x04	Load
0x05	Park
0x08	Play
0x09	Pause
0x0a	Rec
0x0b	Erase
0x10	SETUP
0x11	Layer 1 SETUP
0x12	SETUP RETRY
0x13	SETUP END
0x14	SETUP RAM
0x17	XN Change
0x18	Search & Play
0x19	Search & Pause
0x1a	Search & Record
0x1b	Cooling process for the PU
0x20	TOC/ATIP/LPP Read
0x38	For examining BCA, etc.
0x39	Reading BCA
0x3a	Detection of existence of BCA
0x3c	RF EQ adjustment
0x49	RF End Seek
0x4a	RF Start Seek
0x59	OPC End Seek
0x60	Tilt Profile measurement
0x70	Various measurement commands for the mechanism
0x71	Write Power Calibration command
0x7f	Abort

Table 2 Mecha-con error

Error Code	Remarks
0x80	Unsupported Command
0x81	Illegal Mode
0x82	Illegal Request
0x83	Aborted
0x84	Time out
0x88	Loading Mecha NG
0x89	TOC Read Error
0x8a	PrePit Read Error
0x8b	BCA READ Error
0x8c	RF EQ Adjust Error
0x8d	Write DAC Calibration Error
0x90	Search Address Error
0x91	Illegal Track Request
0xA0	No Disc
0xA1	Disc NG
0xA8	Servo NG Stop
0xA9	Line Adjustment NG
0xAa	Auto Adjustment Data NG
0xb0	Focus Close Fail
0xb1	Focus Servo Failure
0xb5	Focus Jump Fail
0xb8	RF not exist
0xc0	Track Close Fail
0xc1	Track Servo NG
0xc2	Track Jump NG
0xd0	Spindle Start Fail
0xd1	Spindle Stop Fail
0xd2	Spindle High Speed Fail
0xd3	Spindle Low Speed Fail
0xd4	Spindle DVD Wob In Fail
0xd5	OPC end searce Error
0xd6	RF end search Error
0xd7	Spindle DPLL ON Error
0xd8	Spindle RF Error
0xd9	Tilt Adjustment Error

Table 3 Decoder Command

Command Code	Remarks
0x00	NONE
0x01	DVD Decode Stop
0x02	DVD Decode Clear
0x03	DVD User Data Read & Decode
0x04	DVD User Data Read & Decode
0x05	RMD End Seek & Read
0x06	Layer0 Control Data Decode
0x07	Layer1 Control Data Decode
0x08	R physical Information Data Decode
0x09	CGMS Data Decode
0x0a	Set Read Ahead
0x0b	RMD 1,3 Area Clear
0x0c	RMD Read for Verify
0x0d	DVD No DMA Data Read
0x0e	DVD Leadout check
0x0f	DVD Read Ahead Buffering
0x10	DVD-RAM User Data Read & Decode
0x11	DVD-RAM Physical Read
0x20	EE Data Decode
0x21	Buffer Data Host DMA
0x22	M63 DRAM Dummy Data Write
0x23	Buffer Data Copy to testECC
0x24	DVD Error Count Start
0x25	DVD Error Count Stop
0x26	LPP Error Count Start
0x27	LPP Error Count Stop
0x28	DVD Defect Block Detect
0x29	DVD+R TOC Information Read
0x2a	DVD+R SDCB Read
0x2b	DVD+RW FDCB Read
0x2c	DVD Buffering & Copy for RMW
0x2d	DVD Buffering & Copy for RMW
0x2e	DVD+MRW MIP Read
0x2f	DVD+MRW MDT Read
0x30	DVD-RAM DMA Read
0x81	CD Decode Stop
0x82	CD Decode Clear
0x83	CD User Data Cache
0x84	CD User Data Read & Decode
0x85	CD User Data Read & Decode for Read CD Command
0x86	CD Lead in TOC Read
0x87	CD Lead in TOC Read
0x88	CD Text Data Read
0x89	CD PreGap TDB Data Read
0x8a	CD Play Audio
0x8b	CD Play Audio MSF
0x8c	CD Play Audio TRK/IDX
0x8d	CD Play Audio Pause/Resume
0x8e	CD Play Audio Abort

Command Code	Remarks
0x8f	CD Play Audio Check State
0x90	CD No DMA Data Read
0x91	CD Read Ahead Buffering
0x92	There is an address at which the data format changes during pregap. This command is to search for such an address.
0x93	DVD+MRW MIP Read
0x94	DVD+MRW MDT Read
0x95	CD Scan Audio
0x96	CD Scan Check State

Table 4 Decoder error

Error Code	Remarks
0x01	Decode error
0x02	RF not exist
0x03	RMD RF Not Exist
0x04	Lead In RF Not Exist
0x05	Lead In Not Complete
0x06	Illegal Read Request
0x07	Detect Interface Abort Request
0x08	Mecha Search Time Over
0x09	Buffering Time Over
0x0a	Retry Time Over
0x0b	Read Time Out
0x0c	Recovered Data
0x0d	Verify error
0x10	m63 Internal Error
0x11	m63 Formatter Error
0x12	m63 Target ID Over Error
0x13	m63 Header Compare Error
0x14	m63 Uncorrectable Error
0x15	m63 CRC Error
0x16	m63 Etc. Error
0x17	m63 Block Error
0x18	m63 Header C2 Error
0x1a	m63 Transport Error

Table 5 DVD Encoder Command

Command Code	Remarks
0x00	ENC_CMD_NONE
0x01	DAO_WRITE
0x02	DATA_WRITE
0x03	FLUSH_DAO
0x04	FLUSH_INC
0x05	LEADIN_WRITE
0x06	LEADOUT_WRITE
0x07	BORDERIN_WRITE
0x08	BORDEROUT_WRITE
0x09	BORDERLOUT_WRITE
0x0a	PADDING_WRITE
0x0b	CONTROL_WRITE
0x0c	RMD_WRITE
0x0d	OPC_WRITE
0x0e	OPC_READ
0x0f	DC_ERASE
0x10	REFERENCE_WRITE
0x11	DCB_WRITE
0x12	TOC_WRITE
0x13	CLOSE_WRITE
0x14	SECT4_WRITE
0x15	TEST_WRITE
0x16	TEST_WRITE_OFF
0x17	WRITE_START_DAO
0x18	WRITE_START_INC
0x19	AGING_WRITE
0x1a	PADDING_AA_WRITE
0x1b	MSIP_WRITE
0x1c	MSDT_WRITE
0x1d	PRL_WRITE
0x1e	,PRE_WRITE

Table 6 DVD Encoder error

Error Code	Remarks
0x40	Buffer full
0x41	Buffer underrun
0x42	OPC power insufficient
0x43	Excess OPC power
0x44	OPC failed.
0x45	Encoding failed.
0x46	DMA failed.
0x47	DECSS measures
0x48	The rotation speed of the spindle was not the same as that during OPC.
0x49	Writing power 0
0x4a	OPC recording failed. (Retrial possible)
0x4b	Sequence error before recording
0x4c	Sequence error after recording
0x5c	OPC Over Limit
0x5d	OPC Under Limit
0x5e	Verify Error
0x5f	PICNTOVER

Table 7 CD Encoder Command

Command Code	Remarks
0x00	NOP
0x01	Reception of encoded data (where Pregap 2 is to be recorded)
0x02	Reception of encoded data (where Pregaps 1 and 2 are to be recorded)
0x03	Reception of encoded data (where CD-DA is to be recorded)
0x04	Reception of encoded data (where Pregap 2 is to be recorded)
0x05	Reception of encoded data (where Pregaps 1 and 2 are to be recorded)
0x06	Reception of encoded data (Session at once)
0x07	Reception of encoded data (where Pregap 2 is to be recorded)
0x08	Reception of encoded data (where Pregaps 1 and 2 are to be recorded)
0x09	Reception of encoded data (Session at once)
0x0a	Reception of encoded data (Session at Once)
0x0b	Reception of encoded data (Disc at Once)
0x0c	Import of Cue Sheet
0x0d	Recording onto the PMA
0x0e	OPC count recording
0x0f	OPC recording
0x10	OPC playback
0x11	Recording start
0x12	Synchronize Cache
0x13	Recording onto the lead-in
0x14	Recording onto the lead-out
0x15	Close Track
0x16	Erase
0x17	Dummy-writing start
0x18	Dummy-writing stop
0x19	Dummy-erasure start
0x1a	Self-writing
0x1b	Self-erasure
0x1c	Aging writing
0x1d	Index writing
0x1e	M/STA recording

Table 8 CD Encoder error

Error Code	Remarks
0x20	Buffer overrun
0x21	Buffer underrun
0x22	Panic In
0x23	Discontinuous time data
0x24	Excess phase difference of the wobble servo
0x25	Allowed value for ASYOVR count exceeded
0x26	Allowed ASYNC interpolation exceeded
0x27	Invalid Cue Sheet
0x28	Non Cue Sheet
0x29	Disc Full
0x2a	Reserved Track Full
0x2b	Address Error
0x2c	Aborted because of a mechanical error
0x2d	Aborted by the host
0x2e	Invalid Command
0x2f	Target address exceeded
0x30	OPC write error 0 (Before recording: retrieval from recording)
0x31	OPC write error 1 (After recording: retrieval from area search)
0x32	OPC read error 0 (Before reading: retrieval from reading)
0x33	OPC read error 1 (Data error: retrieval from recording or area search)
0x34	OPC read high limit (Retrial after changing power range to higher limit)
0x35	OPC read low limit (Retrial after changing power range to lower limit)
0x36	Encode Start Error
0x37	Unexpected Status Error
0x38	CD Over Power Error
0x39	Shock Detect Error

Table 9 Controller Command

Command Code	Remarks
0x00	No operation
0x01	Mecha Initialize
0x02	Disc At Once
0x03	Track At Once
0x04	Packet Write
0x05	Incremental Write
0x06	Synchronized chase DAO
0x07	Read
0x08	Read CD
0x09	Seek
0x0a	Start/Stop Unit
0x0b	Reserve RZone Command
0x0c	Time Stamp data set
0x0d	Send User Specific Data
0x0e	Data Send
0x0f	Data Receive
0x10	Microcode download
0x11	tray open
0x12	tray close & setup
0x13	Synchronized chase TAO
0x14	Synchronized chase Packet
0x15	Synchronized chase SAO
0x16	Set sequence
0x17	Load-out sequence
0x18	Spindle stop sequence
0x19	Tray open
0x1a	Tray close
0x1b	Mecha Setup
0x1c	DVD Lead-in data read
0x1d	Black disc check
0x1e	Disc at once check
0x1f	Incremental Write check
0x20	DVD-R setup
0x21	DVD-RW setup
0x22	DVD-ROM setup
0x23	CD Next writable check
0x24	DVD Next writable check
0x25	Close Track
0x26	Close Session
0x27	Close Disc for CD
0x28	Close Rzone
0x29	Close Border
0x2a	Get RZone Information
0x2b	Get Track Information
0x2c	CD OPC excute
0x2d	DVD OPC excute
0x2e	CD OPC excute check
0x2f	DVD OPC excute check
0x30	PreGap Read (Packet Track check)

Command Code	Remarks
0x31	PreGap Length check
0x32	Synchronize Cache Incremental
0x33	Reserve Track TAO
0x34	Reserve Track Packet
0x35	Write and Verify Format 1 RMD
0x36	Write and Verify Format 2 RMD
0x37	Write and Verify Format 3 RMD
0x38	Write Format 1 RMD
0x39	Write Format 2 RMD
0x3a	Write Format 3 RMD
0x3b	Verify Format 1 RMD
0x3c	Verify Format 2 RMD
0x3d	Verify Format 3 RMD
0x3e	Do OPC
0x3f	Read Lead-in physical data
0x40	Read Copyright Information
0x41	Read Disc Key
0x42	Read Manufacture's Information
0x43	Read Pre-recorded Information in Lead-in
0x44	Read Unique Disc Identifier of the Disc
0x45	Read BCA
0x46	DVD Write Lead-in
0x47	DVD Write Lead-out
0x48	DVD Write Border In
0x49	DVD Write Border Out
0x4a	DVD Write Border & Lead out
0x4b	DVD Write Padding
0x4c	DVD Write Control Data
0x4d	DVD Write DC Erase
0x4e	Play Audio
0x4f	Play Audio Track/Index
0x50	Resume/Pause
0x51	Read CGMS, CPM
0x52	Read RMD in last Border-out
0x53	Read RMD (rsn:relative sector number)
0x54	fill Next Border Marker
0x55	Write Pre Border in or Lead in
0x56	Close Disc for DVD
0x57	Send Cue Sheet
0x58	Write Session at Once
0x59	Read Media Catalogue Number
0x5a	Read ISRC
0x5b	Read Format Capacity
0x5c	Set Read Ahead
0x5d	Read Header
0x5e	Send CPM, CGMS
0x5f	Send Write Protection Data
0x60	Report AGID
0x61	Report Challenge Key

A

Command Code	Remarks
0x62	Report Key 1
0x63	Report Title Key
0x64	Report AFC
0x65	Report RPC State
0x66	Annul AGID
0x67	Send Challenge Key
0x68	Send Key 2
0x69	Send RPC Structure
0x6a	Enter/Exit Test Write Mode
0x6b	First Track Information check
0x6c	Get Track Information (execution child)
0x6d	Synchronize cache TAO (execution child)
0x6e	Synchronize cache PKT (execution child)
0x6f	Synchronize cache SAO (execution child)
0x70	Full Format
0x71	Grow Border
0x72	Add Border
0x73	Quick Grow Border
0x74	Quick Add Border
0x75	Quick Format
0x76	Close Intermediate Border
0x77	Black the Disc
0x78	Minimally black
0x79	Black a Track/RZone tail
0x7a	Disc Close check
0x7b	Border Close check
0x7c	RZone Close check
0x7d	Synchronize Cache Incremental (execution child)
0x7e	Track Start Address check
0x7f	Set Streaming
0x80	Set CD Speed/Streaming
0x81	Read DVD Structure List
0x82	DVD RF Seek
0x83	Get Last RZone NWA
0x84	Get 1st RZone NWA
0x85	Get 2nd RZone NWA
0x86	Close RZone execution
0x87	Speed down (Inactivity)
0x88	DVD-RW setup (compulsion BLANK DISC)
0x89	Physical Read
0x8a	Rezero Unit
0x8b	Change Power Condition
0x8c	Previous Border in check
0x8d	Next Border Marker close check
0x8e	Border in Close check
0x8f	Border out Close check
0x90	Lead in Close check
0x91	Lead out Close check
0x92	Border Lout Close check

B

C

D

E

F

Command Code	Remarks
0x93	RZone Repair
0x94	Next Border Marker Repair
0x95	Border in Repair
0x96	Border out Repair
0x97	Lead in Repair
0x98	Lead out Repair
0x99	Border Lead out Repair
0x9a	Repair Disc (DVD-R/RW)
0x9b	Read CD Text Data
0x9c	CD Full Format
0x9d	Physical Write
0x9e	Start Recording for CD
0x9f	Black a Session tail
0xa0	PMA write at TAO CD encode error
0xa1	PMA write at Packet CD encode error
0xa2	Rotation Speed up at session closed
0xa3	Get PreWrite or Readable EMBOS Data
0xa4	Report Region reset
0xa5	Send Region reset
0xa6	Setup & xchange
0xa7	Repair Grow Border
0xa8	Read Previous RMD
0xa9	Disc Close (Restricted OverWrite)
0xaa	Border Padding (for first border)
0xab	Read MID or MKB
0xac	Get BCA Data
0xad	SEND_LINK_DATA area clear
0xae	DVD RMD write check
0xaf	PMA write with rotation change
0xb0	LIA write with rotation change
0xb1	LOA write with rotation change
0xb2	Track close with rotation change
0xb3	Write start with rotation change
0xb4	Under-run wait with rotation change
0xb5	2 speed opc for zclv
0xb6	Search & xchange for zclv
0xb7	bca check (exist or not)
0xb8	Pregap read
0xb9	dsp dram copy exec.
0xba	DVD+R setup
0xbb	DVD+RW setup
0xbc	ADIP Information Read
0xbd	Get DVD+R NWA
0xbe	DVD+R SDCB write check
0xbf	Write for DVD+R
0xc0	Write for DVD+RW
0xc1	Synchronize cashe for DVD+R
0xc2	Synchronize cashe for DVD+RW
0xc3	Synchronize cashe for DVD+R (executed in child)

Command Code	Remarks
0xc4	Synchronize cashe for DVD+RW (executed in child)
0xc5	DVD+RW FDCB write check
0xc6	Start Recording for DVD-R/RW
0xc7	Start Recording for DVD+R
0xc8	Start Recording for DVD+RW
0xc9	Reserve Fragment
0xca	Initialize SDCB
0xcb	Plus RW Basic
0xcc	Plus RW Write FDCB
0xcd	Close Session for DVD+R
0xce	Close Fragment for DVD+R
0xcf	Initialize Bitmap
0xd0	Clear Bitmap
0xd1	Fill Lead-in for DVD+R
0xd2	Write Lead-out for DVD+R
0xd3	Fill Intro for DVD+R
0xd4	Write Closure for DVD+R
0xd5	Write TOC for DVD+R
0xd6	Get Deicing Start Address
0xd7	Get Deicing ECC Blocks
0xd8	Move Bitmap
0xd9	Background Format Exec.
0xda	Read DCB
0xdb	Get Last Recorded Address on Bitmap
0xdc	Write Short(64ECC) Lead Out
0xdd	Close DVD+RW
0xde	Tray force open (SLIM only)
0xdf	PU temperature cool down (SLIM only)
0xe0	PU temperature cool down (SLIM only)
0xe1	PU temperature cool down (SLIM only)
0xe2	PU temperature cool down (SLIM only)
0xe3	Read MID or MKB
0xe4	Erase CD with rotation change
0xe5	Self Erase CD with rotation change
0xe6	Self Write CD with rotation change
0xe7	DVD-RAM setup
0xe8	Write start inc with rotation change
0xe9	Write start dao with rotation change
0xea	OPC execute for zclv
0xeb	Get Pregap Information
0xec	Search & xchange for zclv (for playback)
0xed	Read Physical Format Information
0xee	Write Physical Format Information
0xef	Audio Scan
0xf0	Initialize DMT
0xf1	M/SIP write with rotation change
0xf2	M/SDT write with rotation change
0xfc	[PULSTEC] PreWrite Main
0xfd	[PULSTEC] PreWrite OPC

Command Code	Remarks
0xfe	[PULSTEC] PreWrite Write
0xff	[PULSTEC] PreWrite Verify
0x100	time wait (for aging)
0x101	Disc inner search & pause (for aging)
0x102	Disc outer search & pause (for aging)
0x103	Disc trace (for aging)
0x104	Audio play (for aging)
0x105	If aging time is over, tray out (for aging)
0x106	CD track reserve (for aging)
0x107	CD data write (for aging)
0x108	CD data read & verify (for aging)
0x109	DVD rzone reserve (for aging)
0x10a	DVD data write (for aging)
0x10b	DVD data read & verify (for aging)
0x10c	CD Disc erase (for aging)
0x10d	DVD Disc erase (for aging)
0x10e	CD-RW full format (for aging)
0x10f	DVD-RW full format (for aging)
0x110	CD Disc NWA check (for aging)
0x111	DVD Disc NWA check (for aging)
0x112	rzone/track close (for aging)
0x113	CD-R data write full area (for aging)
0x114	DVD-R data write full area (for aging)
0x115	mecha xchange (for aging)
0x116	Random access (for aging)
0x117	Spindle start/stop (for aging)
0x118	Tray open/close (for aging)
0x119	Intermediate time open/close (for aging)
0x11a	DVD+R/RW write (for aging)
0x11b	DVD+R/RW read (for aging)
0x11c	Outer write - Outer read (for aging)
0x11d	Outer write - Inner read (for aging)
0x11e	Inner write - Outer read (for aging)
0x11f	Inner write - Inner read (for aging)
0x120	Inner write - Inner read (for aging)
0x121	Inner write - Inner read (for aging)
0x122	write cd (for aging)
0x123	write dvd (for aging)
0x124	read cd (for aging)
0x125	read dvd (for aging)
0x126	CD-RW quick format (for aging)
0x127	DVD-RW quick format (for aging)
0x128	for ONJYOU aging (for aging)
0x129	for DENPA aging (for aging)
0x12a	for ANKI aging (for aging)
0x140	[MRW] Initialize DMT
0x141	[MRW] Write MTA
0x142	[MRW] Write STA
0x143	[MRW] Write MDT

A

Command Code	Remarks
0x144	[MRW] Write SDT
0x145	[MRW] Close DVD+RW (executed in child)

B

Table 10 Controller error

Error Code	Remarks
0x60	Command Sequence Error
0x61	Logical Unit Communication Failure
0x62	Illegal Logical Block Address
0x63	Internal Controller Error
0x64	Privent Medium Removal
0x65	System Resource Failure
0x66	Authentication Failure
0x67	Key Not Present
0x68	Key Not Established
0x69	Authentication Not End
0x6a	Incompatible Format
0x6b	Region Mismatch
0x6c	Region Reset Count Error
0x6d	De-Compression CRC Error
0x6e	OPC area full
0x6f	OPC area almost full
0x70	Parameter Value Invalid
0x71	Media detect error
0x72	RMA almost full
0x73	Media not Present
0x74	Long Write In Progress
0x75	Session is not full
0x76	Track type is not valid
0x77	track start address is not valid
0x78	track end address is not valid
0x79	track end address error at incomplete track
0x7a	Pregap read error
0x7b	PMA is not complete
0x7c	Vender reset Sequence Error
0x7d	Defect Management Error
0x7f	Data compare error(for aging)

D

E

Table 11 Aging No.

No.	Remarks
00h	Long-time (22H, 96H, 4H) aging
01h	ROW aging (currently not supported)
02h	Entrie-disc recording (joint) aging
0Fh	Normal mode

F

Table 12 Host Command

Command Code	Remarks
0x00	No operation
0x01	Blank the disc
0x02	Minimary blank
0x03	Blank a Track/RZone
0x04	Unreserve a Track
0x05	Blank a Track/RZone tail
0x06	Unclose the last Session/Border
0x07	Erase Session/Border
0x08	Full Format for CD
0x09	Full Format for DVD
0x0a	Grow Border
0x0b	Add Border
0x0c	Quick Grow Border
0x0d	Quick Add Border
0x0e	Quick Format
0x0f	Plus RW Basic
0x10	Close Track
0x11	Close Session
0x12	Close Disc for CD
0x13	Close RZone
0x14	Close Border
0x15	Close Disc for DVD
0x16	Close Intermediate Border
0x17	Close Session for DVD+R
0x18	Close Fragment for DVD+R
0x19	Close DVD+RW
0x1a	Synchronize Cache Disc at once
0x1b	Synchronize Cache Incremental
0x1c	Synchronize Cache for DVD+R
0x1d	Synchronize Cache for DVD+RW
0x1e	Synchronize Cache Session at once
0x1f	Synchronize Cache Track at once
0x20	Synchronize Cache Packet
0x21	Repair RZone
0x22	Annul AGID
0x23	Reserve Track TAO(size:rsv size)
0x24	Reserve Track Packet(size:rsv size)
0x25	Reserve Fragment(size:rsv size)
0x26	Seek
0x27	Do OPC
0x28	Set Read Ahead
0x29	Set Write Speed
0x2a	Start/Stop Unit
0x2b	Change Power Condition
0x2c	Play Audio
0x2d	Play Audio Track Index
0x2e	Resume/Pause
0x2f	Get Track/RZone Information
0x30	Enter/Exit Test Write Mode

Command Code	Remarks
0x31	DVD Next Writable Address Check
0x32	Start Recording for CD
0x33	Start Recording for DVD-R/RW
0x34	Start Recording for DVD+R
0x35	Start Recording for DVD+RW
0x36	Repair Grow Border
0x37	Disc Close (Restricted OverWrite)
0x38	Verify
0x39	PU cooling
0x3a	PreWrite Main
0x3b	PreWrite OPC
0x3c	PreWrite Write
0x3d	PreWrite Verify
0x3e	Read Lead-in physical data
0x3f	Read Copyright Information
0x40	Read Disc Key
0x41	Read BCA
0x42	Read Manufacture's Information
0x43	Read CGMS, CPM
0x44	Read RMD in last Border-out
0x45	Read RMD (rsn:relative sector number)
0x46	Read Pre-recorded Information in Lead-in
0x47	Read Unique Disc Identifier of the Disc
0x48	Read Lead-in physical (PreWrite/Emboss)
0x49	Read Disc Control Block
0x4a	Read Write Protection Data
0x4b	Read DVD Structure List
0x4c	Read Media Catalogue Number
0x4d	Read ISRC
0x4e	Read CD Text Data
0x4f	Read Header
0x50	Report AGID
0x51	Report Challenge Key
0x52	Report Key1
0x53	Report Title Key
0x54	Report ASF
0x55	Report RPC State
0x56	Report Region reset
0x57	Report AGID for CPRM
0x58	Read MID
0x59	Read MKB
0x5a	Read DC RF LEVEL
0x5b	Send User Specific Data
0x5c	Send Challenge Key
0x5d	Send Key2
0x5e	Send RPC Structure
0x5f	Send Cue Sheet
0x60	Send Region reset
0x61	Download Microcode

Command Code	Remarks
0x62	Read
0x63	Read CD
0x64	Physical Read
0x65	Write Disc at once
0x66	Write Incremental
0x67	Write for DVD+R
0x68	Write for DVD+RW
0x69	Write Session at once
0x6a	Write Track at once
0x6b	Write Packet
0x80	Tilt compulsory OFF/ON
0x81	Tilt compulsory neutral
0x82	Tilt compulsory UP/DOWN
0x83	LD read power compulsory OFF/ON
0x84	LD write power compulsory OFF/ON
0x85	LD erase power compulsory OFF/ON
0x86	Exit/Enter Set Initial Write Power High
0x87	Exit/Enter Set Initial Write Power Low
0x88	Exit/Enter Set Initial Erase Power High
0x89	Exit/Enter Set Initial Erase Power Low
0x8a	UP/DOWN Write or Erase Power
0x8b	Register Initial Write or Erase Power
0x8c	Set Recording Write Power
0x8d	Set Recording Erase Power
0x8e	Focus compulsory OFF/ON
0x8f	Lens UP/DOWN
0x90	Focus jump to layer 0/1
0x91	Focus offset adjustment
0x92	Focus balance adjustment
0x93	Focus gain adjustment
0x94	Set Parameter for Focus test move
0x95	Spindle compulsory FG servo OFF/ON
0x96	Spindle compulsory rough servo OFF/ON
0x97	Spindle compulsory RF servo OFF/ON
0x98	Spindle compulsory wobble servo OFF/ON
0x99	Spindle compulsory wobble and DPLL
0x9a	Spindle compulsory frequency PLL
0x9b	Spindle compulsory phase PLL
0x9c	Spindle compulsory short brake
0x9d	Spindle compulsory free run
0x9e	Spindle stop
0x9f	Tracking compulsory OPEN/CLOSE
0xA0	Track jump REVERSE/FORWARD
0xA1	Tracking offset adjustment
0xA2	Tracking balance adjustment
0xA3	Tracking gain adjustment
0xA4	Lens offset adjustment
0xA5	Lens balance adjustment
0xA6	Slider OFF/ON

A

Command Code	Remarks
0xA7	Slider position initialize
0xA8	Slider positioning
0xA9	Slider scan REVERCE/FORWARD
0xAa	Slider test move
0xAb	Set Parameter for Slider test move
0xAc	Loading OPEN/CLOSE
0xAd	Set default value to CRAM
0xAe	READ/WRITE
0xAf	READ/WRITE CRAM
0xB0	READ/WRITE PUCont register
0xB1	READ/WRITE LDD register
0xB2	READ/WRITE EEPROM PU
0xB3	READ/WRITE Temp Sensor
0xB4	READ/WRITE RF63 register
0xB5	Preserve current adjusting values to EEPROM
0xB6	READ/WRITE EEPROM
0xB7	Set D/A parameters
0xB8	Set Disc Type
0xB9	Stop/Play using Mecha.Con. routine
0xBa	Variable Play to Recording
0xBb	Play/Dummy Recording using M.C. routin
0xBc	Slice Level
0xBd	Error Count STOP/START
0xBe	Search 1st writable PCA
0xBf	Write OPC data to 1st writable PCA
0xC0	Read last written PCA
0xC1	Set parameter for OPC Test
0xC2	Set power limit for OPC Test
0xC3	Versatile Command 1 for Mr.Tudome
0xC4	Versatile Command 2 for Mr.Tudome
0xC5	Mecha.Con. Direct Access
0xC6	Mecha.Con. Direct Access part2
0xC7	DC Erase
0xC8	Self Write
0xC9	RF Detect
0xCa	PCA Test Read
0xCb	PCA Test Write
0xCc	Read M63 Buffer
0xCd	Read RL5E Buffer
0xCe	Read R3 Buffer
0xCf	Read Error Information
0xD0	Read Error Information part2
0xD1	Extract Microcode for Mecha.Con.
0xD2	Controller Direct Access
0xD3	Download Microcode for Mecha.Con.
0xD4	Read for EE test
0xD5	Write for EE test
0xD6	Physical Write
0xD7	Dummy command code

Items required for diagnosis

- GGS1030: Operation check program (Diagnose5)
- GGV1035: DVD-ROM (Single/DVDT-001)
- GGV1036: DVD-ROM (Dual/DVDT-002)
- GGV1027: CD-ROM (CDT-304)
- GGV1231: Recorded DVD-R (8x DISC)
- GGV1232: DVD-R blank disc (8x DISC)

① When a drive has not been identified by the SCSI

- • Check SCSI connections.
For details, refer to Service Know-How (SKB05001).
- Do two or more SCSI devices have identical IDs?
 - Is termination made at the correct position?
 - Are pins of the SCSI cable connector bent?
 - Are the cable and/or terminator recommended products? (Recommended cables: CC-200, CC-200-8, CC-201, CC-201-8, recommended terminator: DRM-TM160, as of December 2004)
 - Check the model number of the SCSI board. (SCSI boards whose performance with the drives has been confirmed: Adaptec ASC-29160, ASC-39160, as of December 2004)
 - Restart the system.
 - If "ACARD SCSI: NULL" is displayed during identification, it is likely that the MAIN Assy is in failure.
Replace both the MAIN Assy and Traverse Mechanism Assy.

② When a drive has not been identified by the changer

- • Check the connections of the changer interface cable.
- Check if the wiring monitor indicator is flashing when the rear cover is open.
If it is unlit, it is likely that the WIFB Unit Relay Unit is in failure. Replace the Relay Unit.

③ When an error was generated during reading out or writing to the disc

- • Perform a diagnosis (READ) using Diagnose5.exe. See "7.1.1 OPERATIONAL DIAGNOSIS PROGRAM."
Discs to be used: GGV1035, GGV1036, GGV1027, GGV1231
Diagnosis items
Seek (FULL) 20 times: Threshold values for GGV1035, 1036, 1231: 990 msec, for GGV1027: 870 msec
Random READ 100 times: Threshold values for GGV1035, 1036, 1231: 480 msec, for GGV1027: 450 msec
Error rate: Threshold values for GGV1035: 4.0E-3, for GGV1027, 1231: 6.0E-3
Threshold values for GGV1036: There is no read error.
- Perform a diagnosis (WRITE) using Diagnose5.exe. See "7.1.1 OPERATIONAL DIAGNOSIS PROGRAM."
Discs to be used: GGV1232
Diagnosis item
Writing at the innermost and outermost tracks: Threshold value: 6.0E-3

Typical error codes during reading

Sence Key	ASC	ASC Q	Description
03	11	05	L-EC Uncorrectable Error
03	11	06	CIRC Unrecovered Error
03	15	02	Positioning Error Detected by Read of Medium

Typical error codes during writing

Sence Key	ASC	ASC Q	Description
03	0C	00	Writer Error
03	73	03	Power Caribration Area Error
03	15	02	Positioning Error Detected by Read of Medium
05	21	02	Invalid Address for Write (Note 1)

Note 1: This error code also appears when a buffer-underrun error was generated.

7.1.7 SCSI ERROR CODE TABLE

- INF8090i Ver5 rev1.2 of SFF is assumed to be a standard.
- The typical one is shown as follows.

Sense Key	ASC	ASC-Q	Description	Description	Information Byte
08	00	00	BLANK CHECK	Read command was generated for unwritten parts.	-
0B	00	06	I/O PROCESS TERMINATED, PLAY OPERATION ABORTED	TIO message was received.	-
02	04	01	LOGICAL UNIT IS IN PROCESS OF BECOMING READY	Now setting up.	-
02	04	03	LOGICAL UNIT NOT READY, MANUAL INTERVENTION REQUIRED	It is in the state which cannot perform download of a firmware that media are contained etc.	-
02	04	04	LOGICAL UNIT NOT READY, FORMAT IN PROGRESS	Now formatting.	-
02	04	07	LOGICAL UNIT NOT READY, OPERATION IN PROGRESS	Recording RMD or session closing in progress	-
02	04	08	LOGICAL UNIT NOT READY, LONG WRITE IN PROGRESS	Now recording user's data	-
04	08	00	LOGICAL UNIT COMMUNICATION FAILURE	Internal abnormal condition, such as time out of SPC, was detected.	-
04	08	01	LOGICAL UNIT COMMUNICATION TIME-OUT	Time out of SPC, etc.	-
04	09	03	SPINDLE SERVO FAILURE	Spindle starting / stop error	-
03	0C	00	WRITE ERROR	Record error	Record error address
03	0C	08	WRITE ERROR - RECOVERY FAILED	The write-in error at the time of the Repair RZone command	-
03	11	01	READ RETRIES EXHAUSTED	Number-of-times over of lithograph rye at the time of data read-out (a maximum of 32 times)	-
03	11	05	L-EC UNCORRECTABLE ERROR	The read-out error of a DVD system	-
03	11	06	CIRC UNRECOVERED ERROR	The read-out error of a CD system	-
03	11	0D	DE-COMPRESSION CRC ERROR	The read-out error of a CDTEXT system	-
03	15	02	POSITIONING ERROR DETECTED BY READ OF MEDIUM	The search error at the time of data read-out	-
05	1A	00	PARAMETER LIST LENGTH ERROR	The data length transmitted by the Mode Select command does not suit a regular format.	-
04	1B	00	SYNCHRONOUS DATA TRANSFER ERROR	Time out during transfer in SYNC mode	-
05	20	00	INVALID COMMAND OPERATION CODE	Unsupported command code	-
05	21	00	LOGICAL BLOCK ADDRESS OUT OF RANGE	LBA is out of supported area.	-
05	21	02	INVALID ADDRESS FOR WRITE	LBA specified by the Write command is not suitable for writing. (the error code at the time of a buffer undershirt run be also elaborate)	It is the address at the time of an undershirt run.
05	24	00	INVALID FIELD IN CDB	There is unsupported information in command block.	-
05	26	00	INVALID FIELD IN PARAMETER LIST	There is unsupported information in parameter list.	-
07	27	04	PERSISTENT WRITE PROTECT	Persistent write protect - DVD-RW	-
06	28	00	NOT READY TO READY CHANGE, MEDIUM MAY HAVE CHANGED	Medium was changed.	-
06	29	00	POWER ON, RESET, OR BUS DEVICE RESET OCCURRED	Reset condition	-
06	2A	01	MODE PARAMETERS CHANGED	It was changed by the initiator of others [parameter / of Mode Select/Sense] (only in case of SCSI).	-
05	2C	00	COMMAND SEQUENCE ERROR	Command sequence error	-
02	30	00	INCOMPATIBLE MEDIUM INSTALLED	Setup error disc. Or, a medium for which commands cannot be executed	-
05	30	02	CANNOT READ MEDIUM - INCOMPATIBLE FORMAT	It was going to perform unsuitable read-out and information acquisition to media, such as performing Read PMA to CD-ROM.	-
05	30	05	CANNOT WRITE MEDIUM - INCOMPATIBLE FORMAT	A medium for which commands cannot be executed (in recording)	-
03	31	00	MEDIUM FORMAT CORRUPTED	Format command failed.	-
03	31	01	FORMAT COMMAND FAILED	Illegal address (in recording)	-
02	3A	00	MEDIUM NOT PRESENT	No medium	-
04	44	00	INTERNAL TARGET FAILURE	Drive internal error	-
04	4C	00	LOGICAL UNIT FAILED SELF-CONFIGURATION	The sum check error at the time of firmware download	-

Sense Key	ASC	ASCQ	Description	Description	Information Byte
0B	4E	00	OVERLAPPED COMMANDS ATTEMPTED	The following command was published during disconnection (it does not generate in the present system).	-
03	51	00	ERASE FAILURE	Failure of erase operation	-
03	51	01	ERASE FAILURE - Incomplete erase operation detected	The media erased halfway	-
04	53	00	MEDIA LOAD OR EJECT FAILED	Load/eject error	-
05	53	02	MEDIUM REMOVAL PREVENTED	Ejecting medium is prohibited.	-
05	55	00	SYSTEM RESOURCE FAILURE	Authentication preference is improper.	-
03	57	00	UNABLE TO RECOVER TABLE-OF-CONTENTS	RMD or control data could not be read upon setup. Or, abnormal data.	Read address
05	64	00	ILLEGAL MODE FOR THIS TRACK	Mode that cannot executes commands.	-
05	6F	00	COPY PROTECTION KEY EXCHANGE FAILURE - AUTHENTICATION FAILURE	Authentication failed.	-
05	6F	01	COPY PROTECTION KEY EXCHANGE FAILURE - KEY NOT PRESENT	There is no key on the disc.	-
05	6F	02	COPY PROTECTION KEY EXCHANGE FAILURE - KEY NOT ESTABLISHED	Bus key has not been established.	-
05	6F	03	READ OF SCRAMBLED SECTOR WITHOUT AUTHENTICATION	This disc is copy-protected.	-
05	6F	04	MEDIA REGION CODE IS MISMATCHED TO LOGICAL UNIT REGION	The region of drive differs from that of the disc.	-
05	6F	05	DRIVE REGION MUST BE PERMANENT/REGION RESET COUNT ERROR	Cannot change the region of drive.	-
03	72	00	SESSION FIXATION ERROR	Session close failed.(other than lead-in, border-in)	Recording error address
03	72	01	SESSION FIXATION ERROR WRITING LEAD-IN	Session close failed.(Lead-in, border-in)	Recording error address
03	72	02	SESSION FIXATION ERROR WRITING LEAD-OUT	Session close failed.(Lead-out, border-out).	Recording error address
05	72	03	SESSION FIXATION ERROR - INCOMPLETE TRACK IN SESSION	There is an incomplete R zone. (The last R zone has not been closed.)	-
05	72	04	EMPTY OR PARTIALLY WRITTEN RESERVED TRACK	There is a reserved R zone that has not been closed	-
05	72	05	NO MORE RZONE RESERVATIONS ARE ALLOWED	No more R Zone can be reserved.	-
01	73	01	POWER CALIBRATION AREA ALMOST FULL	PCA is almost full.	-
03	73	02	POWER CALIBRATION AREA IS FULL	PCA is almost full.	-
03	73	03	POWER CALIBRATION AREA ERROR	OPC failed.	OPC address
03	73	04	PROGRAM MEMORY AREA/RMA UPDATE FAILURE	RMD recording failed.	RMD address
03	73	05	PROGRAM MEMORY AREA/RMA IS FULL	RMA is full.	-
01	73	06	PROGRAM MEMORY AREA/RMA IS (almost) FULL	RMA is almost full.	-
03	OC	80	WRITE ERROR -R3 CHIP ERROR	Write error (R3 Chip error).	Write error address

7.1.8 AGING MODE

■ Items required for aging

- GGV1027: CD-ROM (CDT-304)
- GGV1035: DVD-ROM (Single/DVDT-001)
- GGV1036: DVD-ROM (Dual/DVDT-002)
- GGV1232: DVD-R blank disc (8x DISC)
- GGF1485: Special device for RS-232C communication for the changer drive (used for short-circuiting XCLMP)

■ Overview of Aging mode

In Aging mode, data recording/reading/comparison can be performed only by a driver, without using the interface. A setup disc is detected, and aging will be performed depending on the type of the detected disc. To start an aging operation, set a combination of jumper pins then turn on the power while short-circuiting between the XCLMP signal and GND.

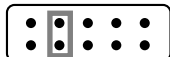
If an error is generated, the LED will flash or light. In such a case, cancel short-circuiting between the XCLMP signal and GND then unload the disc. The content of the error is recorded in an error log. (See "7.1.4 Acquisition of the Error History" on how to check error logs.)

Note:

When an error was generated, if the disc is unloaded or the power to the drive is turned off without canceling short-circuiting between the XCLMP signal and GND, no more sessions can be written onto the same DVD-R disc.

■ How to enter Aging mode

Short-circuit the fourth jumper pin on the rear of the drive. The operational mode can be selected in combination of open and short-circuiting statuses of the remaining pins (see "List of Aging Functions").



■ Operational Modes of Aging

Operational modes of aging are as follows:

1. 22-hour (96-hour) aging mode

Long-time aging mode. When a DVD-R disc is used, only a blank disc can be used, except in the case of Disc-Area Division mode. When a DVD-RW disc is used, full erasure is performed then recording starts. With DVD-R/RW discs, recording can be performed at half the maximum speed supported by the medium used, by changing the statuses of Pin 2. (If the maximum speed of a disc is normal speed, this function is not available.) This aging mode also supports "Disc-Area Division mode," which enables multisession recording on one DVD-R disc.

2. Four-hour aging mode

This is the four-hour version of the above-mentioned 22-hour Aging mode. Basic operations are the same as those in 22-hour Aging mode.

3. Entire-Disc Recording mode

In this mode, full formatting of a DVD-RW disc or entire-disc recording of a DVD-R disc can be performed. With a DVD-RW disc, formatting once or three times can be selected by changing the statuses of Pin 5.

4. Continuous Aging mode

Repeated tracing of the innermost and outermost tracks of the CD/DVD-ROM discs can be performed. Tracing continues until the power is turned off or short-circuiting between the XCLMP signal and GND is canceled.

Note:

When short-circuiting between the XCLMP signal and GND is canceled during an aging operation, aging is terminated at a breakpoint of operation. (The LED flashes three times.)

■ LED indication in Aging mode

If an aging operation is interrupted and terminated while in progress because of an error, etc., the LED flashes to inform you of the cause, as follows:

LED status	Cause
Unlit	Aging is completed without a problem.
Lit	Multisession writing was impossible because of insufficient recording capacity in Disc-Area Division
Flashes once	Immediately after the power is turned on or resetting (waiting for short-circuiting between the XCLMP signal and GND)
Flashes twice	An error was generated during aging.
Flashes three times	Short-circuiting between the XCLMP signal and GND was canceled during aging.
Flashes four times	A disc that cannot be used in the selected Aging mode was loaded.

List of Aging Functions

Jumper-pin Setting	Media			
<div> <div>S</div> <div>S</div> <div>C</div> <div>S</div> <div>M</div> </div> <div> <div>W</div> <div>W</div> <div>S</div> <div>L</div> <div>A</div> </div> <div> <div>1</div> <div>0</div> </div>	CD-ROM	DVD-ROM	DVD-R	DVD-RW
	22-hour aging Operation type ①	22-hour aging Operation type ③	22-hour aging, 20 divisions Operation type ⑤ Number of iterations of reading and comparing: 200	22-hour aging Operation type ⑥ In addition to the above operations, 15-minute CD-recording-power irradiation is performed then aging is completed.
	96-hour aging Operation type ①	96-hour aging Operation type ③	96-hour aging Operation type ⑤ Number of iterations of reading and comparing: 45	96-hour aging Operation type ⑥
	22-hour aging Operation type ①	22-hour aging Operation type ③	22-hour aging, at half speed, 20 divisions Operation type ⑤ Number of iterations of reading and comparing: 400	22-hour aging, at half speed Operation type ⑥ In addition to the above operations, 15-minute CD-recording-power irradiation is performed then aging is completed.
	22-hour aging Operation type ①	22-hour aging Operation type ③	22-hour aging, 20 divisions Operation type ⑤ Number of iterations of reading and comparing: 10	22-hour aging Operation type ⑥
	4-hour aging Operation type ①	4-hour aging Operation type ③	4-hour aging, 20 divisions Operation type ⑤ Number of iterations of reading and comparing: 40	4-hour aging Operation type ⑥ In addition to the above operations, 15-minute CD-recording-power irradiation is performed then aging is completed.
	4-hour aging Operation type ①	4-hour aging Operation type ③	4-hour aging Operation type ⑤ Number of iterations of reading and comparing: 2	4-hour aging Operation type ⑥
	Continuous aging Operation type ②	Continuous aging Operation type ④	All-address writing	Full formatting (once)
	Continuous aging Operation type ②	Continuous aging Operation type ④	All-address writing	Full formatting (continuously three times)

Operation type ①	Operation type ③	Operation type ⑤	Operation type ⑥
1. Searching for "00:02:00" 2. Tracing for 10 seconds 3. Searching for 800 seconds before the lead-out 4. Tracing for 10 seconds 5. Stopping for 10 seconds 6. Repeating steps 1 to 5 above	1. Searching for "30000h" 2. Tracing for 10 seconds 3. Searching for 27150h before the lead-out 4. Tracing for 10 seconds 5. Stopping for 10 seconds 6. Repeating steps 1 to 5 above	1. Reserving the addresses up to LBA = 50000h for a blank disc 2. Executing recording of 63 ECCs from NWA 3. Executing reading and comparing n times for 63 ECCs just recorded 4. Repeating steps 2 and 3 When the specified number of hours has elapsed, or when recording has been done to the end of the disc, the RZONE is closed, and aging is completed.	1. Executing Full-area-DC erasure 2. Executing recording of 31 ECCs from NWA 3. Executing reading and comparing once for 31 ECCs just recorded 4. Repeating steps 2 and 3 When recording has been done to the end of the disc, recording restarts from LBA = 0. When the specified number of hours has elapsed, the RZONE is closed, and aging is completed.
Operation type ②	Operation type ④	All-address writing	Full formatting
Steps 1 to 4 of Operation type ① are repeated.	Steps 1 to 4 of Operation type ③ are repeated.	1. Executing recording on the entire user-data area 2. Closing the RZONE 3. Recording on the border and lead-out 4. Recording on the lead-in	1. Recording on the lead-in 2. Recording on the entire user data area 3. Recording on the border and lead-out

7.1.9 DISASSEMBLY

Note 1 : Do NOT look directly into the pickup lens. The laser beam may cause eye injury.

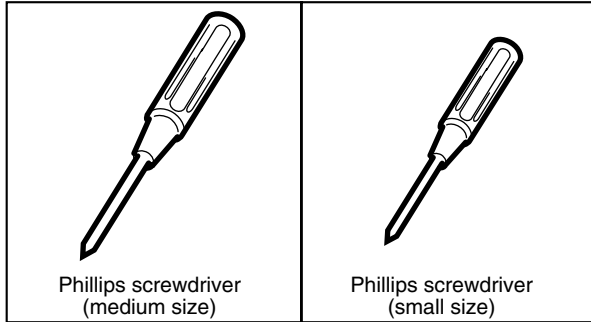
Note 2 : As the laser driver is mounted on the pickup, no short-circuit switch for the laser diode is provided.

Note 3 : Even if the unit shown in the photos and illustrations in this manual may differ from your product, the procedures described here are common.

Replacement of the Traverse Mechanism and Main Unit-S

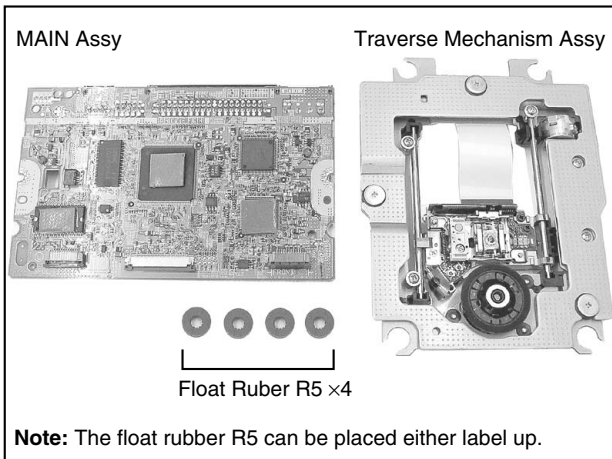
Items to be prepared

Tools to be used



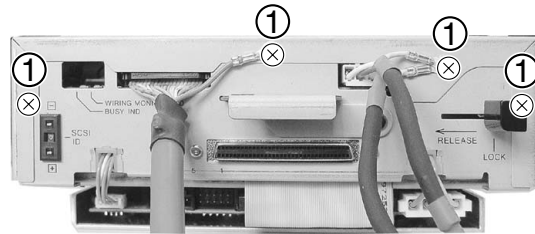
Traverse Mechanism & Main Unit-S (DXX2554)

Note: Be sure to replace both the Traverse Mechanism Assy and Main Assy when either needs to be replaced. For details, see "2.4 TRAVERSE MECHANISM & MAIN UNIT-S."



1 Upper Cover DR

① Remove the four screws.



• Rear view



② Push the lock lever in to the RELEASE position and slide the upper cover DR backward until it stops (about 1 cm).

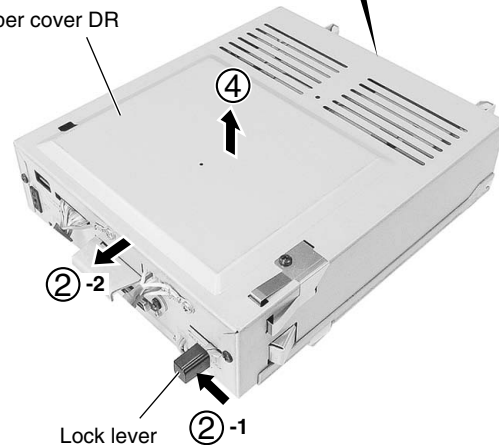
③ Unhook the two hooks by pushing both front sides from the outside.

Note:
When unhooking, care must be taken not to bend the hooks. They are to be used for reassembly.

④ Remove the upper cover DR.

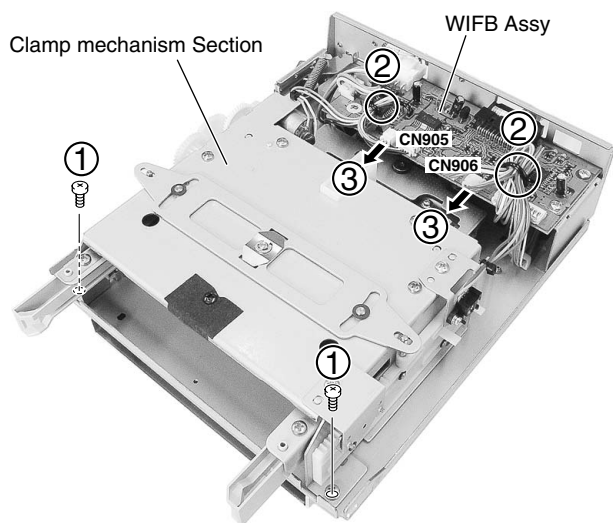


Upper cover DR

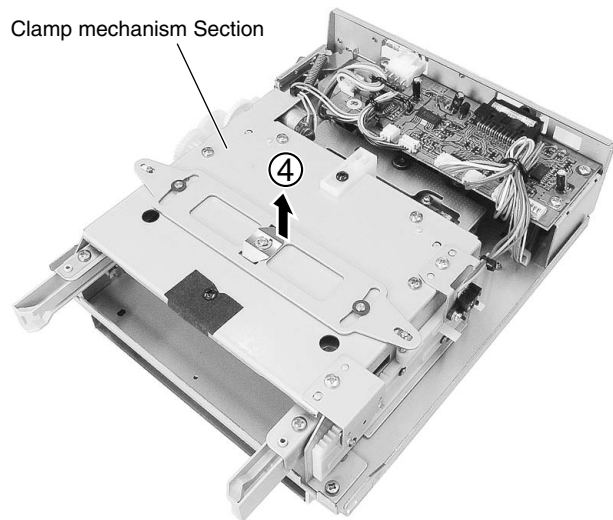


2 Clamp Mechanism Section

- ① Remove the two screws.
- ② Release the two binders.
- ③ Disconnect the two connectors.



- ④ Remove the Clamp mechanism Section.

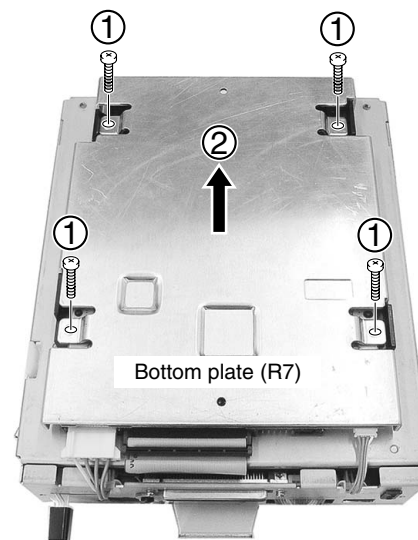


3 MAIN Assy

Note:

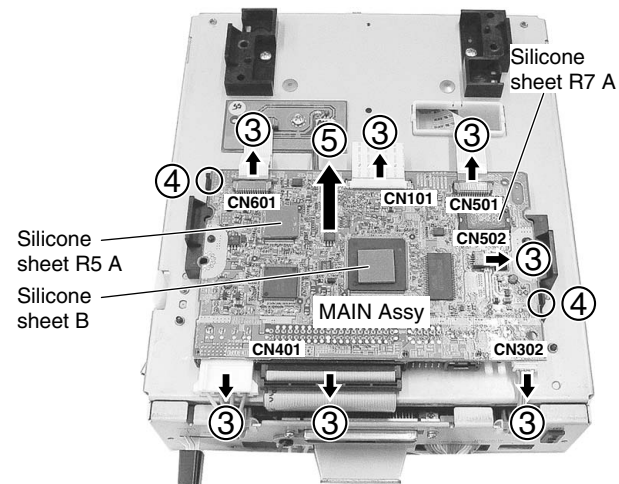
Reattach the upper cover DR before undertaking the subsequent procedures, in order to avoid damaging the Traverse Mechanism.

- ① Remove the four screws.
- ② Remove the bottom plate (R7).



• Bottom view

- ③ Disconnect the four flexible cables and three connectors.
- ④ Unhook the two hooks.
- ⑤ Remove the MAIN Assy.



• Bottom view

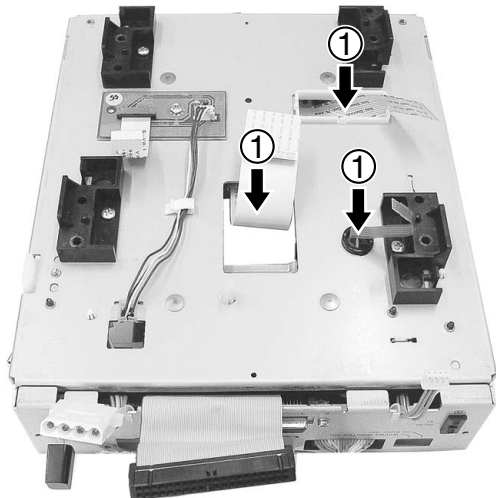
Note:

Detach silicone sheet B, silicone sheet R5 A and silicone sheet R7 A from the old Main Assy and reattach it to the new Main Assy.

Replace

4 Traverse Mechanism Assy

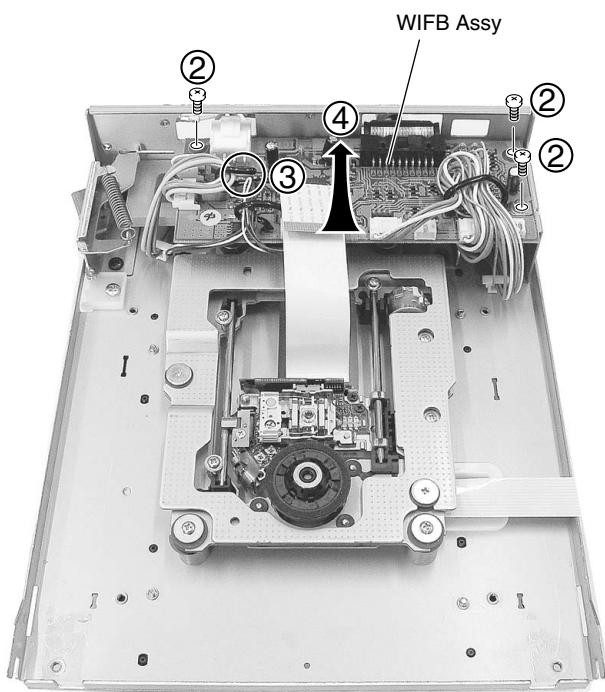
- ① Push the flexible cables toward the inside.



• Bottom view

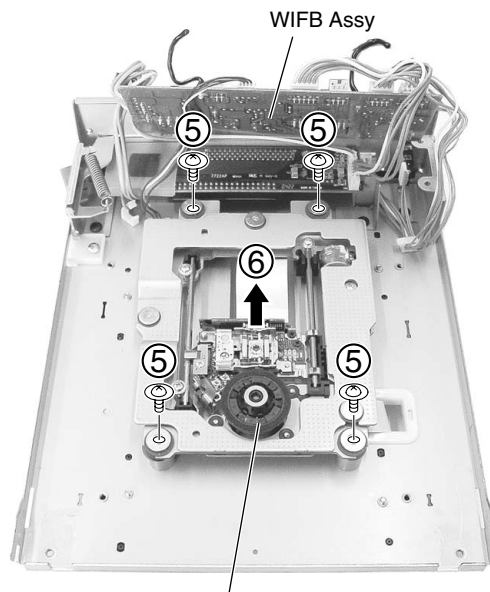


- ② Remove the three screws.
③ Release the one binder.
④ Stand the WIFB Assy.



- ⑤ Remove the four float screws.

- ⑥ Remove the Traverse mechanism Assy.



Traverse mechanism Assy



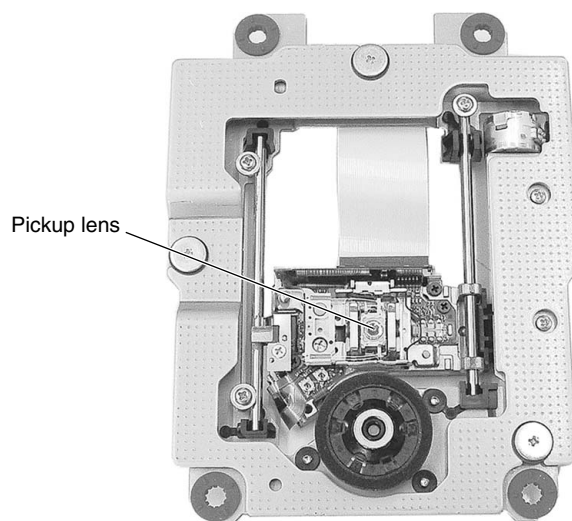
Replace

● Cleaning the pickup lens



Before shipment, be sure to clean the pickup lens, using the following cleaning materials:

Cleaning liquid : GEM1004
Cleaning paper : GED-008



7.1.10 INSTALLATION OF THE DRIVE

For instructions on how to open the access doors, see the operating instructions for the changer. Before installation, be sure to specify the following settings at the rear of each drive to be installed.

• SCSI ID assignment

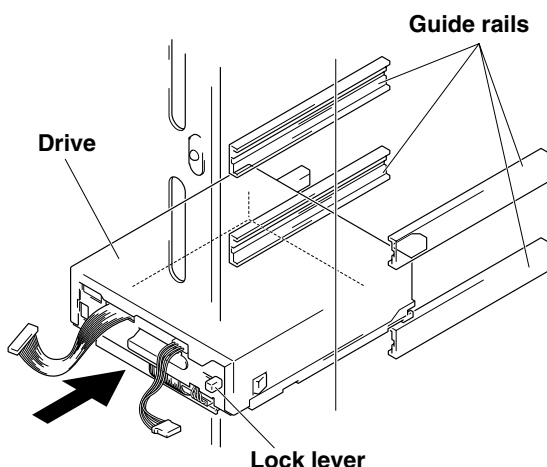
Specify the SCSI IDs to be used so as to ensure that the same SCSI ID is not assigned by more than one drive on the same SCSI bus.

Warning about static electricity

Always be sure never to touch the contacts or ports when operating drives.

Also be sure to touch a metallic surface on the changer before installing additional drives to the changer.

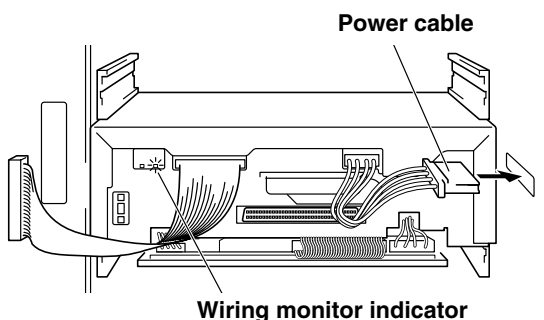
1. When inserting a drive, be sure to place the drive on the changer guide rails and push the drive in until the lock lever on the drive shifts to the locked position. Maybe you can hear a clicking sound then.



When a drive is to be removed from the changer, flip the lock lever to the released position and then pull the drive out from the changer.

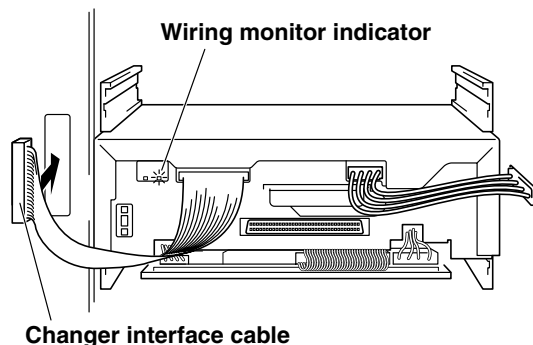
2. Connect the power cable.

- When the power cable has been connected, the wiring monitor indicator on the rear of the drives (orange) will light up.



3. Connect the changer interface cable.

- When the changer interface cable has been connected, the wiring monitor indicators will flash at two-second intervals.

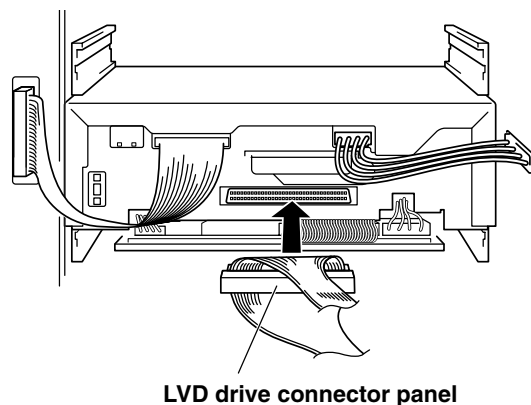


NOTE:

Connect the changer interface cable to the connector corresponding to the bay in which the drives have been installed. (Note that labels are affixed to connectors indicating the corresponding bay number.) Note that it is extremely important to do this, as connecting the changer interface cable to a neighboring bay will result in damage to discs and the disc transport mechanism.

4. Connect the LVD drive connector panel.

Connect the optional LVD drive connector panel (DRM-LN721, for 2 drives; or DRM-LN741, for 4 drives).



7.2 IC INFORMATION

- The information shown in the list is basic information and may not correspond exactly to that shown in the schematic diagrams.

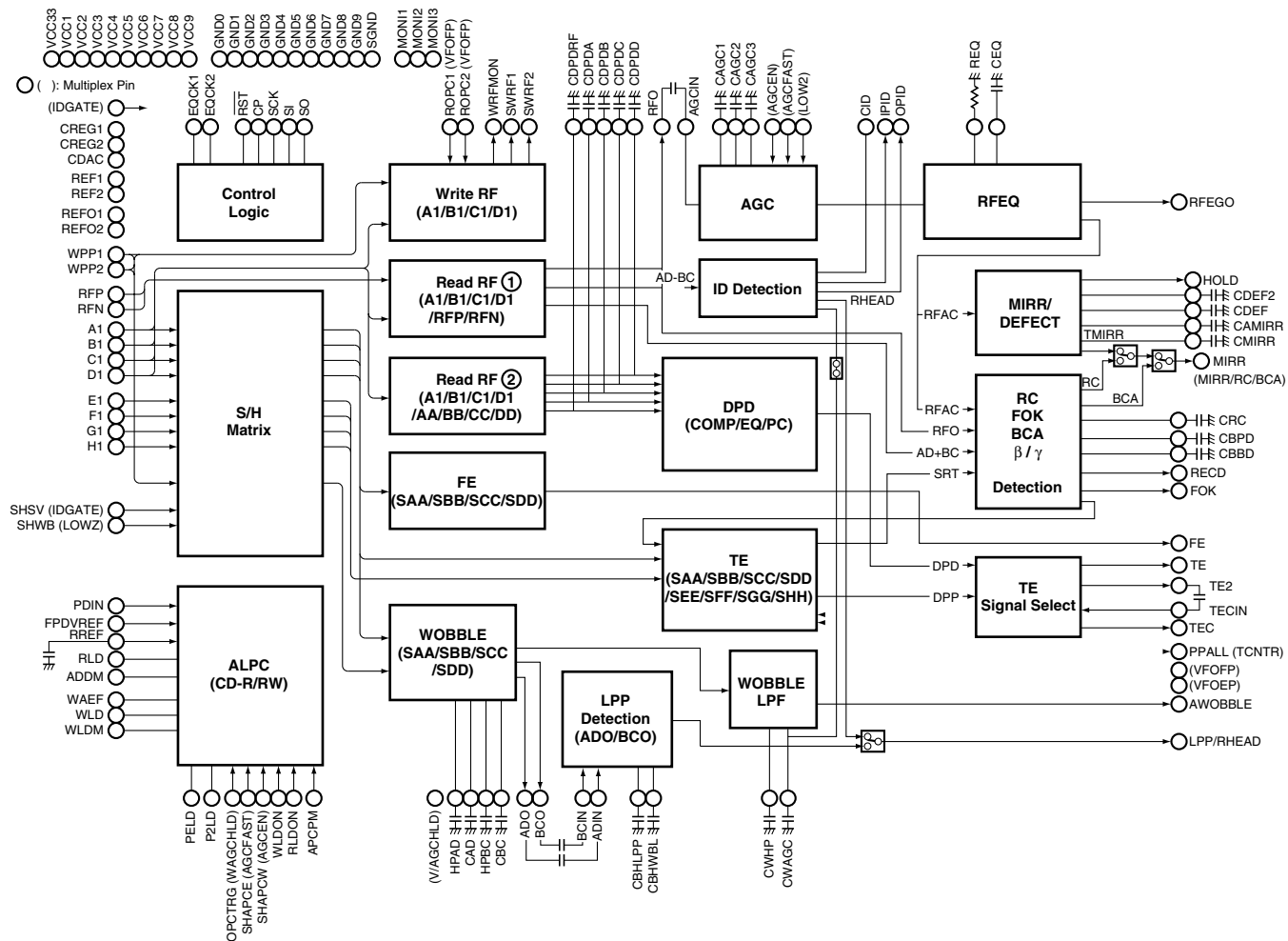
- List of IC

UPC3330GC-YEB-A, UPD63630GM-UEV-A, K4S161622D-TC80, DS90LV027ATM, BU2373FV, M30700FKLGP, S-8520X15MC-LYA, MM1478RFBE, S-8520X52MC-LZL, S-T111B25MC-OGK, BD7905BFS, TC74HC375AF

■ UPC3330GC-YEB-A (MAIN ASSY : IC101)

- High-speed Response CD/DVD-ROM playback, CD-R/RW, DVD±R/RW recording RF Amp., Error Amp.

- **Block Diagram**



● Pin Function

No.	Pin Name	I/O	Pin Function
1	GND0	–	Analog ground
2	RFP	I	RF differential signal (+) input
3	RFN	–	RF differential signal (–) input
4	WPP1	I	External signal input 1 for push-pull
5	WPP2	I	External signal input 2 for push-pull
6	GND1	–	Analog ground
7	A1	I	Main beam signal (A1) input
8	B1	I	Main beam signal (B1) input
9	C1	I	Main beam signal (C1) input
10	D1	I	Main beam signal (D1) input
11	VCC2	–	Analog power supply
12	REFI2	I	PDIC reference voltage input
13	REFO1	O	Pickup/internal reference voltage output (REFO2 pin output = 1.65 V : 2.4V)
14	E1	I	Sub beam signal (E1) input
15	F1	I	Sub beam signal (F1) input
16	G1	I	Sub beam signal (G1) input
17	H1	I	Sub beam signal (H1) input
18	GND2	–	Analog ground
19	HPAD	–	Capacitor connection pin for setting WOBBLE circuit HPF band
20	CAD	–	Capacitor connection pin for setting WOBBLE circuit AGC response speed
21	HPBC	–	Capacitor connection pin for setting WOBBLE circuit HPF band
22	CBC	–	Capacitor connection pin for setting WOBBLE circuit AGC response speed
23	GND3	–	Analog ground
24	PDIN	I	Laser monitor current input pin for CD-R/RW
25	FPDVREF	I	Front monitor reference voltage input pin
26	APCPH	–	Capacitor connection pin for setting ALPC circuit peak hold
27	RREF	–	ALPC smoothing capacitor connection pin for read
28	RLD	O	Laser driver control output for read
29	RLDM	I	Laser driver control amp. (–) pin for read
30	VCC3	–	Analog power supply
31	WREF	–	ALPC smoothing capacitor connection pin for write
32	WLD	O	Laser driver control output for write
33	WLDM	I	Laser driver control amp. (–) pin for write
34	PELD	O	Peak power output pin
35	P2LD	O	Peak power 2 output pin
36	CREG1	O	Regulator voltage (2.5V) output pin (for monitoring)
37	CREG2	O	Regulator voltage (2.5V) output pin (for monitoring)
38	REFI	I	DSP supply voltage input pin (3.3V)
39	REFO2	O	DSP reference voltage output pin (REFI pin = 3.3V : 1.65V output)
40	VCC4	–	Analog power supply
41	ADO	O	(A+D) signal output of WOBBLE circuit
42	BCO	O	(B+C) signal output of WOBBLE circuit
43	GND4	–	Analog ground
44	CDAC	O	DAC reference voltage output pin (for monitoring)
45	VCC5	–	Analog power supply
46	BCIN	I	(B+C) signal input
47	ADIN	I	(A+D) signal input
48	CBHWBL	–	Capacitor connection pin for setting LPP circuit bottom hold (WOBBLE level)
49	CBHLPP	–	Capacitor connection pin for setting LPP circuit bottom hold (LPP level)
50	GND5	–	Analog ground

A

No.	Pin Name	I/O	Pin Function
51	RLDON	I	ALPC control signal input for read
52	RST	I	Register reset input
53	SCK	I	Clock input for register setting
54	SO	O	Serial data output (open-drain output)
55	SI	I	Serial data input
56	CP	I	Command (address) / data (parameter) identification signal input
57	VCC6	–	Digital power supply
58	WLDON	I	ALPC control signal input for write
59	OPCTRG WAGCHLD	I I	OPCTRG signal input / WOBBLE AGC hold signal input (DVD-RAM)
60	SHWB LOWZ	I I	Sample hold pulse input for WOBBLE signal / input impedance of AGC control signal (DVD-RAM)
61	SHSV IDGATE	I I	Sample hold pulse input for SERVO signal / ID GATE control signal (DVD-RAM)
62	SHAPCRE AGCFAST	I I	Sample hold pulse input for ALPC read/erase / input impedance of AGC control signal (DVD-RAM)
63	SHAPCW AGCEN	I I	Sample hold pulse input for ALPC write / AGC enable control signal (DVD-RAM)
64	ROPC1 VFOFP	I I	WRF sample hold pulse input for read 1 / VFO front pulse signal input (DVD-RAM)
65	ROPC2 VFOEP	I I	WRF sample hold pulse input for read 2 / VFO end pulse signal input (DVD-RAM)
66	GND6	–	digital ground
67	EQCK1	I	Fixed clock input
68	EQCK2	I	Equalizer automatic tracking clock input
69	RECD	O	Unrecorder part detection signal output
70	SGND	–	Analog ground (Sub-straight)
71	IPID	O	Inner PID signal output
72	OPID	O	Outer PID signal output
73	LPP RHEAD	O O	LPP detect pin / Rough header detect signal (DVD-RAM)
74	TEC	O	Tracking zero cross signal output
75	FOK	O	Focus OK signal output
76	HOLD	O	Diffect detect signal output
77	MIRR	O	Mirror detect / BCA signal output
78	VCC33	O	3.3V power supply (for monitoring)
79	CWAGC	–	Capacitor connection pin for setting WOBBLE circuit AGC response speed
80	CWHP	–	Capacitor connection pin for setting WOBBLE circuit HPF band
81	AWOBBLE	O	WOBBLE signal output (analog signal)
82	GND7	–	Analog ground
83	TECIN	I	Tracking zero cross comparator signal input
84	TE2	O	Tracking error signal output (variable band) for tracking zero cross signal generation
85	TE	O	Tracking error signal output for servo
86	PPALL TCNTR	O O	Main side push-pull signal output / tracking center signal output (DVD-RAM)
87	FE	O	Focus error signal output
88	CID	–	Capacitor connection pin for ID detect LPF
89	VCC7	–	Analog power supply
90	CRC	–	Capacitor connection pin for radial contrast circuit

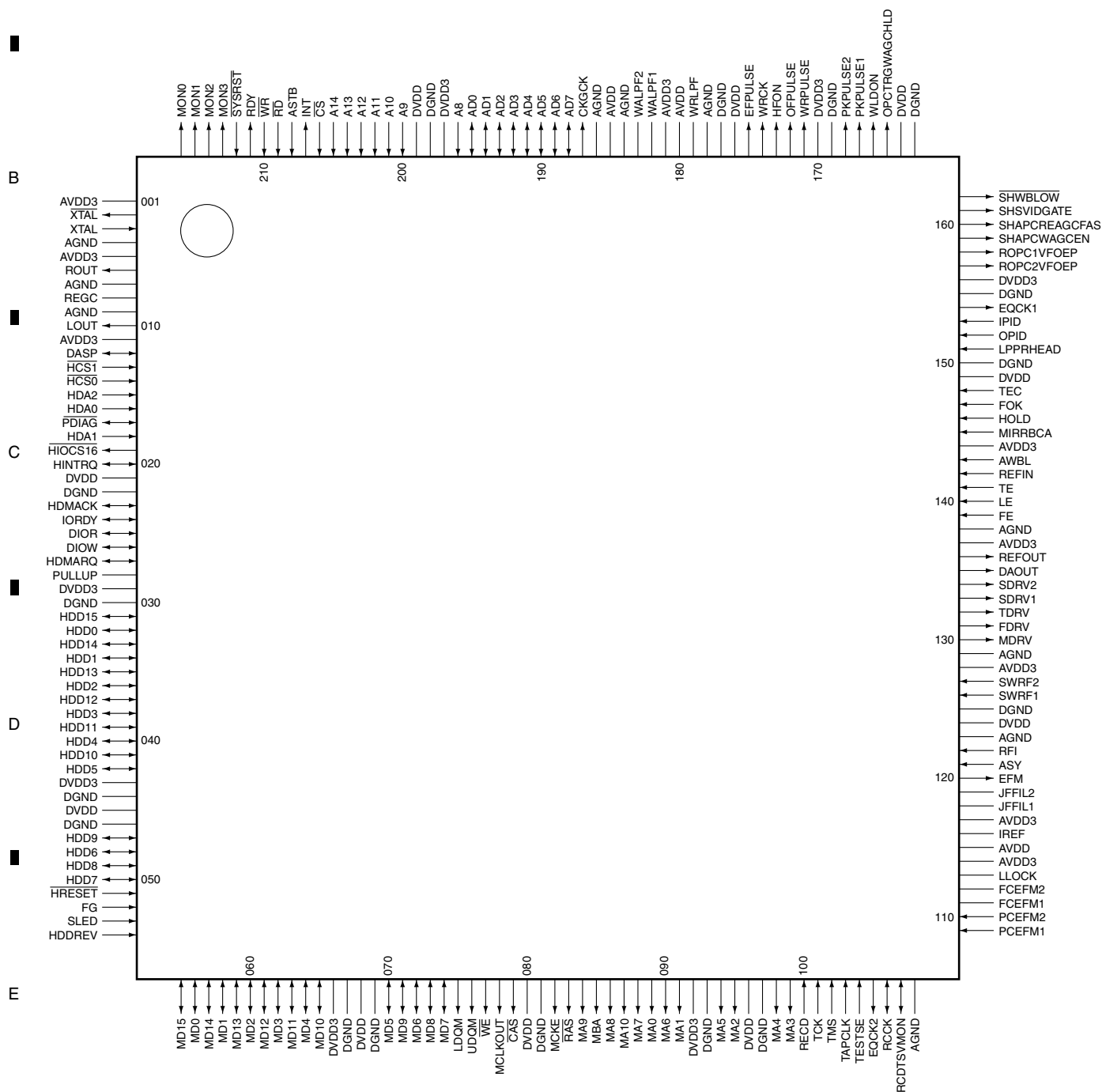
F

No.	Pin Name	I/O	Pin Function
91	CBPD	–	Capacitor connection pin for β , γ detection (peak)
92	CBBB	–	Capacitor connection pin for β , γ detection (bottom)
93	CDEF2	–	Capacitor connection pin for deffect circuit 2
94	CDEF	–	Capacitor connection pin for deffect circuit
95	RFEQO	O	Equalizer output
96	CAMIRR	–	Capacitor connection pin for mirror circuit
97	CMIRR	–	Capacitor connection pin for mirror circuit
98	VCC8	–	Analog power supply
99	CAGC3	–	Capacitor connection pin for RFAGC circuit
100	CAGC2	–	Capacitor connection pin for RFAGC circuit
101	CAGC1	–	Capacitor connection pin for RFAGC circuit
102	GND8	–	Analog ground
103	REQ	–	Resistor connection pin for setting RF equalizer circuit current
104	CEQ	–	Capacitor connection pin for equalizer fc automatic adjustment circuit
105	GND9	–	Analog ground
106	CDPDD	–	Capacitor connection pin for setting DPD (D signal) HPF band
107	CDPDC	–	Capacitor connection pin for setting DPD (C signal) HPF band
108	CDPDRF	–	Capacitor connection pin for setting DPD (RF signal) HPF band
109	CDPDB	–	Capacitor connection pin for setting DPD (B signal) HPF band
110	CDPDA	–	Capacitor connection pin for setting DPD (A signal) HPF band
111	VCC9	–	Analog power supply
112	AGCIN	I	AGC input
113	RFO	O	Read RF signal output
114	VCC1	–	Analog power supply
115	SWRF1	O	WRF signal sample hold signal output
116	SWRF2	O	WRF signal sample hold signal output
117	WRFMON	O	WRF signal monitor pin
118	MONI3	O	Internal signal monitor pin
119	MONI2	O	Internal signal monitor pin
120	MONI1	O	Internal signal monitor pin

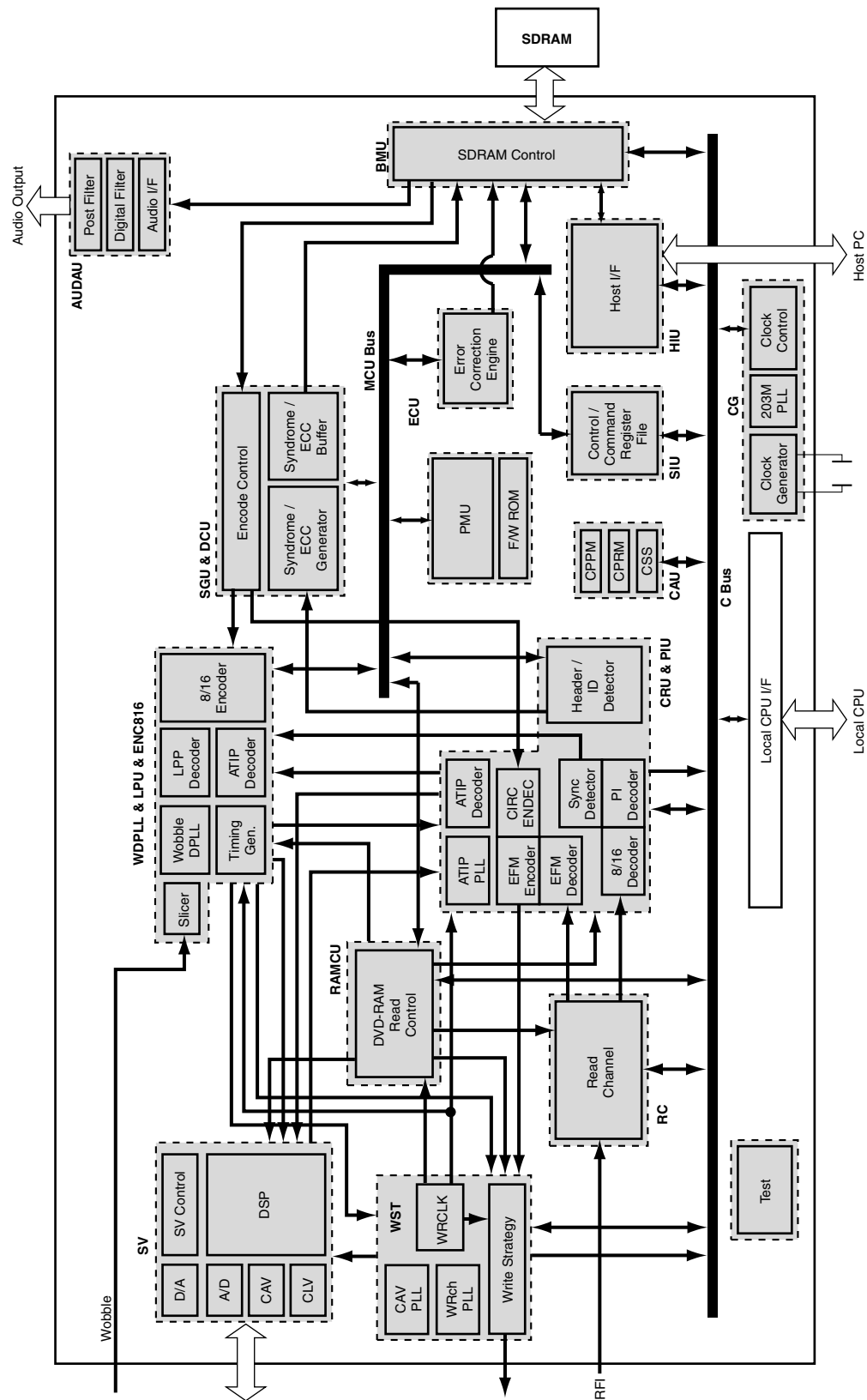
UPD63630GM-UEV-A (MAIN ASSY : IC201)

- CD/DVD-ROM playback, CD-R/RW, DVD±R/RW recording High-speed 1-chip controller (ATAPI interface)

Pin Arrangement (top view)



● Block Diagram



● Pin Function

No.	Pin Name	I/O	Pin Function
1	AVDD3	–	Analog 3.3V positive power supply pin (for crystal resonator)
2	XTAL	O	Crystal resonator connection pin
3	XTAL	I	Crystal resonator connection pin
4	AGND	–	Analog ground pin (for crystal resonator)
5	AVDD3	–	Analog 3.3V positive power supply pin (for audio DAC)
6	ROUT	O	Internal audio DAC Right channel output
7	AGND	–	Analog ground pin (for audio DAC)
8	REGC	–	Capacitor connection pin for SCF regulator
9	AGND	–	Analog ground pin (for audio DAC)
10	LOUT	O	Internal audio DAC Left channel output
11	AVDD3	–	Analog 3.3V positive power supply pin (for audio DAC)
12	DASP	I/O	Drive active, slave present signal (include pull-up resistance)
13	HCS1	I	Host interface chip select input
14	HCS0	I	Host interface chip select input
15	HDA2	I	Host interface chip address signal input
16	HDA0	I	Host interface chip address signal input
17	PDIAG	I	Diagnostic signal (open-drain) (include pull-up resistance)
18	HDA1	I	Host interface address signal input
19	HIOCS16	O	Interrupt signal output to host (3-state, open-drain)
20	HINTRQ	I	Host interface read input signal During Ultra DMA burst, becomes the $\overline{\text{HDMARDY}}$: HSTROBE signal
21	DVDD	–	Digital 1.5V positive power supply pin (for internal logic)
22	DGND	–	Digital ground pin (for internal logic)
23	HDMACK	I/O	DMA acknowledge pin
24	IORDY	O	I/O channel ready (open-drain) During Ultra DMA burst, becomes the $\overline{\text{HDMARDY}}$: HSTROBE signal, 3-state pin
25	DIOR	I/O	Host interface read input signal During Ultra DMA burst, becomes the $\overline{\text{HDMARDY}}$: HSTROBE signal
26	DIOW	I/O	Host interface write input signal During Ultra DMA burst, becomes the STOP signal
27	HDMARQ	O	DMA request signal output (3-state)
28	PULLUP	–	Pull-up resistance connection pin. Connect to 5V or 3.3V.
29	DVDD3	–	Digital 3.3V positive power supply pin (for pin 8 - pin 54)
30	DGND	–	Digital ground pin (for pin 8 - pin 54)
31	HDD15 HDD8	I/O	Host interface data bus (include pull-up resistance)
32	HDD0 HDD6	I/O	Host interface data bus (include pull-up resistance)
33	HDD14 HDD9	I/O	Host interface data bus (include pull-up resistance)
34	HDD1 HDD5	I/O	Host interface data bus (include pull-up resistance)
35	HDD13 HDD10	I/O	Host interface data bus (include pull-up resistance)
36	HDD2 HDD4	I/O	Host interface data bus (include pull-up resistance)
37	HDD12 HDD11	I/O	Host interface data bus (include pull-up resistance)
38	HDD3 HDD3	I/O	Host interface data bus (include pull-up resistance)

No.	Pin Name	I/O	Pin Function
39	HDD11	I/O	Host interface data bus (include pull-up resistance)
	HDD12		
40	HDD4	I/O	Host interface data bus (include pull-up resistance)
	HDD2		
41	HDD10	I/O	Host interface data bus (include pull-up resistance)
	HDD13		
42	HDD5	I/O	Host interface data bus (include pull-up resistance)
	HDD1		
43	DVDD3	–	Digital 3.3V positive power supply pin (for pin 8 - pin 54)
44	DGND	–	Digital ground pin (for pin 8 - pin 54)
45	DVDD	–	Digital 1.5V positive power supply pin (for internal logic)
46	DGND	–	Digital ground pin (for internal logic)
47	HDD9	I/O	Host interface data bus (include pull-up resistance)
	HDD14		
48	HDD6	I/O	Host interface data bus (include pull-up resistance)
	HDD0		
49	HDD8	I/O	Host interface data bus (include pull-up resistance)
	HDD15		
50	HDD7	I/O	Host interface data bus
51	HRESET	I	Host reset input
52	FG	I	FG signal input
53	SLED	I	Sled position sensor input
54	HDDREV	I	Host interface data bus select pin (H : normal, L : reverse)
55	MD15	I/O	Buffer memory interface data bus
56	MD0	I/O	Buffer memory interface data bus
57	MD14	I/O	Buffer memory interface data bus
58	MD1	I/O	Buffer memory interface data bus
59	MD13	I/O	Buffer memory interface data bus
60	MD2	I/O	Buffer memory interface data bus
61	MD12	I/O	Buffer memory interface data bus
62	MD3	I/O	Buffer memory interface data bus
63	MD11	I/O	Buffer memory interface data bus
64	MD4	I/O	Buffer memory interface data bus
65	MD10	I/O	Buffer memory interface data bus
66	DVDD3	–	Digital 3.3V positive power supply pin (for pin 55 - pin 107)
67	DGND	–	Digital ground pin (for pin 55 - pin 107)
68	DVDD	–	Digital 1.5V positive power supply pin (for internal logic)
69	DGND	–	Digital ground pin (for internal logic)
70	MD5	I/O	Buffer memory interface data bus
71	MD9	I/O	Buffer memory interface data bus
72	MD6	I/O	Buffer memory interface data bus
73	MD8	I/O	Buffer memory interface data bus
74	MD7	I/O	Buffer memory interface data bus
75	LDQM	O	Lower byte data I/O mask control signal
76	UDQM	O	Higher byte data I/O mask control signal
77	WE	O	Buffer memory interface write enable signal
78	MCLKOUT	O	SDRAM clock output
79	CAS	O	Buffer memory interface column address strobe control signal
80	DVDD	–	Digital 1.5V positive power supply pin (for internal logic)

A

No.	Pin Name	I/O	Pin Function
81	DGND	–	Digital ground pin (for internal logic)
82	MCKE	O	SDRAM clock enable control signal
83	$\overline{\text{RAS}}$	O	Buffer memory interface raw address strobe control signal
84	MA9	O	Buffer memory interface address bus
85	MBA	O	Buffer memory interface bank address signal
86	MA8	O	Buffer memory interface address bus
87	MA10	O	Buffer memory interface address bus
88	MA7	O	Buffer memory interface address bus
89	MA0	O	Buffer memory interface address bus
90	MA6	O	Buffer memory interface address bus
91	MA1	O	Buffer memory interface address bus
92	DVDD3	–	Digital 3.3V positive power supply pin (for pin 55 - pin 107)
93	DGND	–	Digital ground pin (for pin 55 - pin 107)
94	MA5	O	Buffer memory interface address bus
95	MA2	O	Buffer memory interface address bus
96	DVDD	–	Digital 1.5V positive power supply pin (for internal logic)
97	DGND	–	Digital ground pin (for internal logic)
98	MA4	O	Buffer memory interface address bus
99	MA3	O	Buffer memory interface address bus
100	RECD	I	RECD signal input
101	TCK	I	Test pin. Always connect to DGND.
102	TMS	I	Test pin. Always connect to DGND.
103	TAPCLK	I	Test pin. Always connect to DGND.
104	TESTSE	I	Test pin. Always connect to DGND.
105	EQCK2	O	RF equalizer auto tracking clock output
106	RCCK	O	Read channel clock output
107	RCDTSVMON	O	Read channel data output / servo block monitor output
108	AGND	–	Analog ground pin (for EFMPLL)
109	PCEFM1	–	Read channel phase comparator capacitor connection pin
110	PCEFM2	–	Read channel phase comparator capacitor connection pin
111	FCEFM1	–	Read channel frequency comparator capacitor connection pin
112	FCEFM2	–	Read channel frequency comparator capacitor connection pin
113	LLOCK	–	Capacitor connection pin
114	AVDD3	–	Analog 3.3V positive power supply pin (for EFMPLL)
115	AVDD	–	Analog 1.5V positive power supply pin (for EFMPLL)
116	IREF	I	Read channel analog reference current input pin
117	AVDD3	–	Analog 3.3V positive power supply pin (for EFMCOMP)
118	JFFIL1	–	Capacitor connection pin for jitter feedback
119	JFFIL2	–	Capacitor connection pin for jitter feedback
120	EFM	O	EFM comparator output
121	ASY	I	EFM comparator asymmetry adjustment voltage input
122	RFI	I	RF signal input to EFM comparator
123	AGND	–	Analog ground pin (for EFMCOMP)
124	DVDD	–	Digital 1.5V positive power supply pin (for internal logic)
125	DGND	–	Digital ground pin (for internal logic)
126	SWRF1	I	WRF sample hold signal input (A/D converter input)
127	SWRF2	I	WRF sample hold signal input (A/D converter input)
128	AVDD3	–	Analog 3.3V positive power supply pin (for ADC (SWRF1, SWRF2), DAC)
129	AGND	–	Analog ground pin (for ADC (SWRF1, SWRF2), DAC)
130	MDRV	O	Spindle drive output (D/A converter output)

F

No.	Pin Name	I/O	Pin Function
131	FDRV	O	Focus drive output (D/A converter output)
132	TDRV	O	Tracking drive output (D/A converter output)
133	SDRV1	O	Sled drive output (D/A converter output)
134	SDRV2	O	Sled drive output (D/A converter output)
135	DAOUT	O	D/A converter output
136	REFOUT	O	Reference voltage output
137	AVDD3	–	Analog 3.3V positive power supply pin (for SVADC)
138	AGND	–	Analog ground pin (for SVADC, WBLSLICE)
139	FE	I	Focus error signal input (A/D converter input)
140	LE	I	Lens error signal input (A/D converter input)
141	TE	I	Tracking error signal input (A/D converter input)
142	REFIN	I	Reference voltage signal input (A/D converter input)
143	AWBL	I	Analog Wobble input pin
144	AVDD3	–	Analog 3.3V positive power supply pin (for WBLSLICE)
145	MIRRBGA	I	Mirror signal or BGA signal input
146	HOLD	I	HOLD control signal input
147	FOK	I	Focus OK signal
148	TEC	I	Tracking zero cross signal input
149	DVDD	–	Digital 1.5V positive power supply pin (for internal logic)
150	DGND	–	Digital ground pin (for internal logic)
151	LPPRHEAD	I	LPP signal input (DVD-R/RW) / Rough header detect signal (DVD-RAM)
152	OPID	I	Outer PID signal input (DVD-RAM)
153	IPID	I	Inner PID signal input (DVD-RAM)
154	EQCK1	O	RF equalizer fixed clock output
155	DGND	–	Digital ground pin (for pin 145 - pin 175)
156	DVDD3	–	Digital 3.3V positive power supply pin (for pin 145 - pin 175)
157	ROPC2VFOEP	O	Running OPC sample hold signal / VFO end pulse signal output (DVD-RAM)
158	ROPC1VFOEP	O	Running OPC sample hold signal / VFO end pulse signal output (DVD-RAM)
159	SHAPCWAGCEN	O	APC write sample hold signal / RF AGC control signal output (DVD-RAM)
160	SHAPCREAGCFAS	O	APC read/erase sample hold signal / RF AGC fast control signal output (DVD-RAM)
161	SHSVIDGATE	O	Sample hold signal for servo / ID gate control signal output (DVD-RAM)
162	SHWBLOWZ	O	Sample hold signal for WOBBLE / RF AGC impedance control signal output (DVD-RAM)
163	DGND	–	Digital ground pin (for internal logic)
164	DVDD	–	Digital 3.3V positive power supply pin (for internal logic)
165	OPCTRGWAGCHLD	I/O	OPCTRG signal output (DVD) / WOBBLE AGC hold control signal output (DVD-RAM)
166	WLDON	O	Laser driver write laser control signal
167	PKPULSE1	O	Peak pulse 1 output (write laser driver control signal)
168	PKPULSE2	O	Peak pulse 2 output (write laser driver control signal)
169	DGND	–	Digital ground pin (for pin 145 - pin 175)
170	DVDD3	–	Digital 3.3V positive power supply pin (for pin 145 - pin 175)
171	WRPULSE	O	Write pulse (write laser driver control signal)
172	OFFPULSE	O	Off pulse (write laser driver control signal)
173	HFON	O	Laser driver high-frequency superimposition control signal
174	WRCK	O	Write clock
175	EFMPULSE	O	EFM pulse output (write laser driver control signal)
176	DVDD	–	Digital 1.5V positive power supply pin (for inner logic)
177	DGND	–	Digital ground pin (for inner logic)
178	AGND	–	Analog ground pin (for DLL)
179	WRLPF	–	Connect to ground (Depending on the test results, it may be necessary to connect a capacitor.)
180	AVDD	–	Analog 1.5V positive power supply pin (for DLL, WAPLL)

A

No.	Pin Name	I/O	Pin Function
181	AVDD3	–	Analog 3.3V positive power supply pin (for DLL, WAPLL)
182	WALPF1	–	Capacitor connection pin 1 for WRCH-PLL
183	WALPF2	–	Capacitor connection pin 2 for WRCH-PLL
184	AGND	–	Analog ground pin (for WAPLL)
185	AVDD	–	Analog 1.5V positive power supply pin (for CG block)
186	AGND	–	Analog ground pin (for CG block)
187	CKGCK	O	Clock generator output
188	AD7	I/O	Local CPU address / data multiplexed bus
189	AD6	I/O	Local CPU address / data multiplexed bus
190	AD5	I/O	Local CPU address / data multiplexed bus
191	AD4	I/O	Local CPU address / data multiplexed bus
192	AD3	I/O	Local CPU address / data multiplexed bus
193	AD2	I/O	Local CPU address / data multiplexed bus
194	AD1	I/O	Local CPU address / data multiplexed bus
195	AD0	I/O	Local CPU address / data multiplexed bus
196	A8	I	Local CPU address bus
197	DVDD3	–	Digital 3.3V positive power supply pin (for pin 187 - pin 216)
198	DGND	–	Analog ground pin (for internal logic)
199	DVDD	–	Digital 1.5V positive power supply pin (for internal logic)
200	A9	I	Local CPU address bus
201	A10	I	Local CPU address bus
202	A11	I	Local CPU address bus
203	A12	I	Local CPU address bus
204	A13	I	Local CPU address bus
205	A14	I	Local CPU address bus
206	$\overline{\text{CS}}$	I	Chip select input from local CPU
207	INT	O	Interrupt request signal output to local CPU (3-state, open-drain)
208	ASTB	I	Address strobe signal input
209	$\overline{\text{RD}}$	I	Read strobe signal input from local CPU
210	$\overline{\text{WR}}$	I	Write strobe signal input from local CPU
211	RDY	O	Access wait control signal from local CPU to SDRAM (3-state, open-drain)
212	$\overline{\text{SYSRST}}$	I	Reset input
213	MON3	O	For test signal monitoring
214	MON2	O	For test signal monitoring
215	MON1	O	For test signal monitoring
216	MON0	O	For test signal monitoring

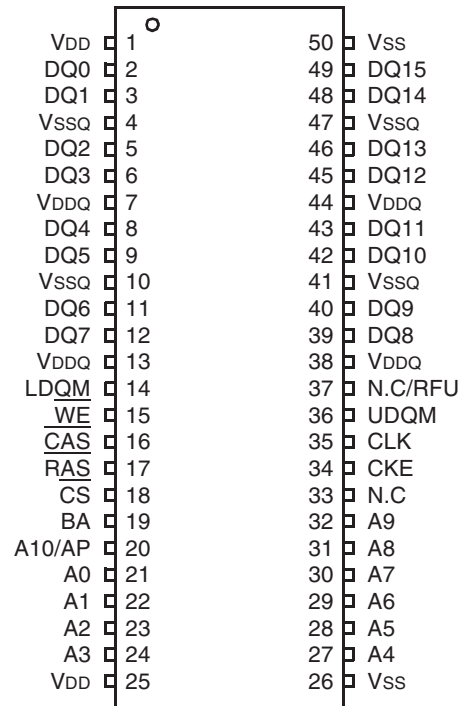
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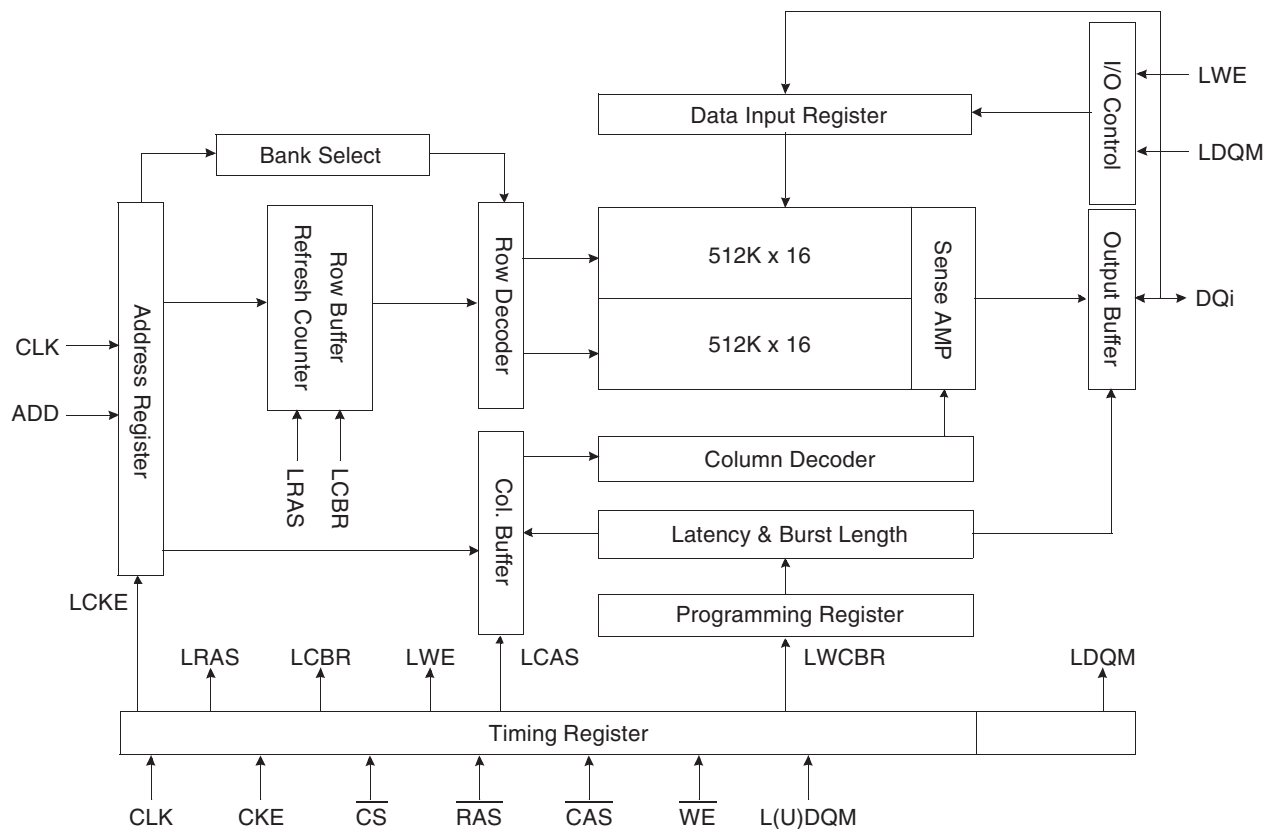
■ K4S161622D-TC80 (MAIN ASSY : IC202)

- 512 × 16-bit × 2 Banks Synchronous DRAM

● **Pin Arrangement (top view)**



- **Block Diagram**



● Pin Function

A

B

C

D

E

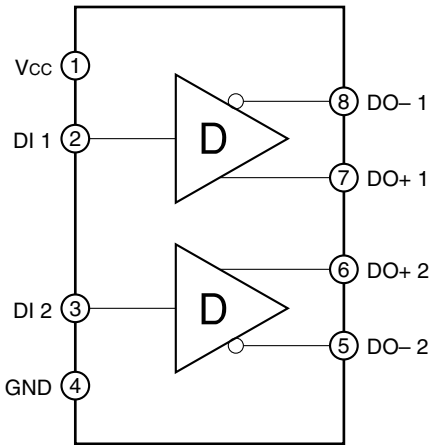
F

No.	Pin Name	Pin Function
1	V _{DD}	Power supply pin
2	DQ0	Data I/O pin
3	DQ1	Data I/O pin
4	V _{SSQ}	Ground pin for data output
5	DQ2	Data I/O pin
6	DQ3	Data I/O pin
7	V _{DDQ}	Power supply pin for data output
8	DQ4	Data I/O pin
9	DQ5	Data I/O pin
10	V _{SSQ}	Ground pin for data output
11	DQ6	Data I/O pin
12	DQ7	Data I/O pin
13	V _{DDQ}	Power supply pin for data output
14	LDQM	Data I/O mask pin
15	WE	Write enable pin
16	CAS	Column address strobe pin
17	RAS	Row address strobe pin
18	CS	Chip select pin
19	BA	Bank select pin
20	A10/AP	Address pin
21	A0	Address pin
22	A1	Address pin
23	A2	Address pin
24	A3	Address pin
25	V _{DD}	Power supply pin
26	V _{SS}	Ground pin
27	A4	Address pin
28	A5	Address pin
29	A6	Address pin
30	A7	Address pin
31	A8	Address pin
32	A9	Address pin
33	N.C	Not used
34	CKE	Clock enable pin
35	CLK	System clock pin
36	UDQM	Data I/O mask pin
37	N.C / RFU	Not used / Reserve
38	V _{DDQ}	Power supply pin for data output
39	DQ8	Data I/O pin
40	DQ9	Data I/O pin
41	V _{SSQ}	Ground pin for data output
42	DQ10	Data I/O pin
43	DQ11	Data I/O pin
44	V _{DDQ}	Power supply pin for data output
45	DQ12	Data I/O pin
46	DQ13	Data I/O pin
47	V _{SSQ}	Ground pin for data output
48	DQ14	Data I/O pin
49	DQ15	Data I/O pin
50	V _{SS}	Ground pin

■ **DS90LV027ATM (MAIN ASSY : IC203)**

- LVDS Dual High-speed Differential Driver

● **Block Diagram**



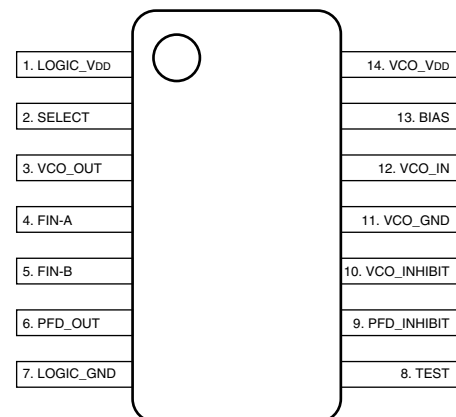
● **Pin Function**

No.	Pin Name	I/O	Pin Function
1	Vcc	–	Positive power supply pin +3.3V ± 0.3V
2	DI 1	I	TTL/CMOS driver input pin
3	DI 2	I	TTL/CMOS driver input pin
4	GND	–	Ground pin
5	DO– 2	O	Inverting driver output pin
6	DO+ 2	O	Non-inverting driver output pin
7	DO+ 1	O	Non-inverting driver output pin
8	DO– 1	O	Inverting driver output pin

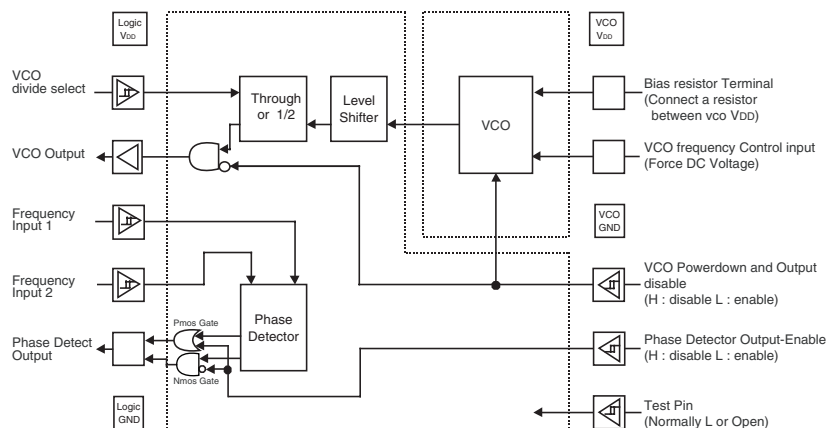
BU2373FV (MAIN ASSY : IC205)

- VCO and Phase-Detector for PLL system

● Pin Arrangement (topview)



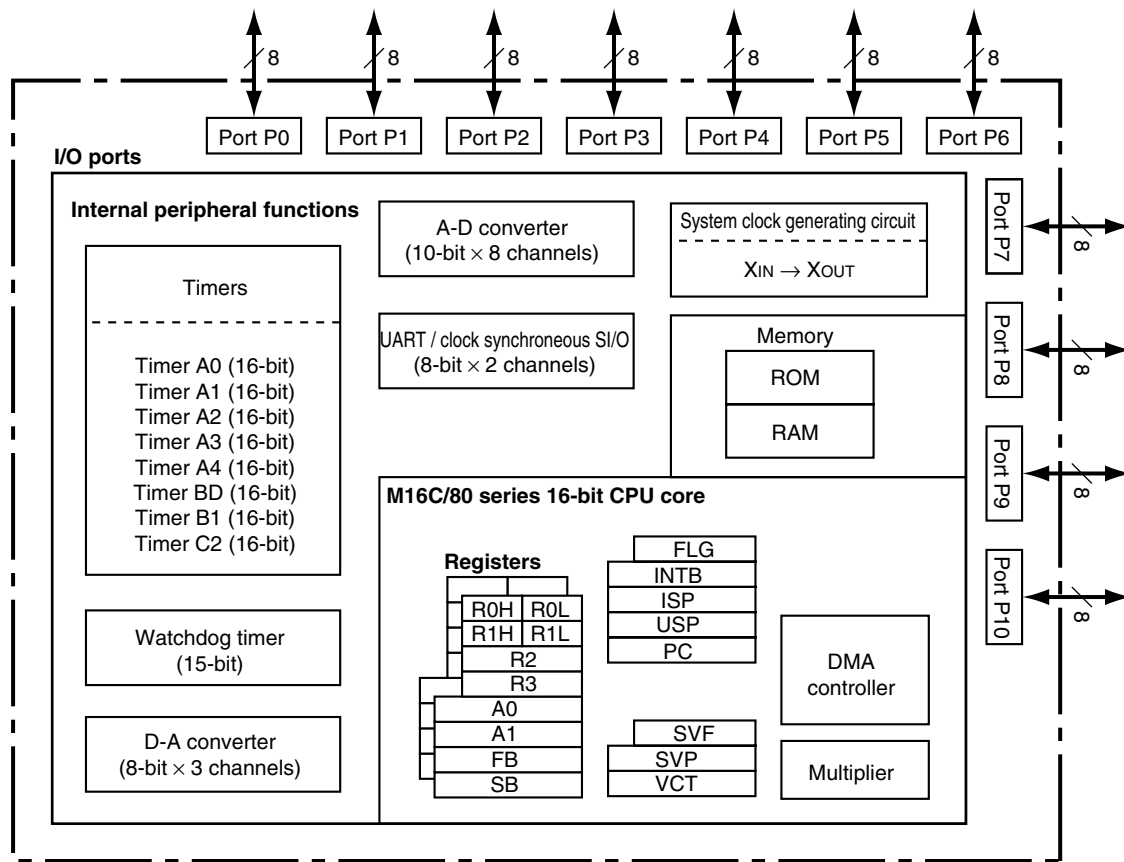
● Block Diagram



● Pin Function

No.	Pin Name	Pin Function
1	LOGIC_VDD	Digital power supply
2	SELECT	VCO output frequency select (H : 1/2 output, L : 1/1 output)
3	VCO_OUT	VCO output
4	FIN-A	Input reference frequency is applied to FIN-A
5	FIN-B	Input for VCO external counter output frequency
6	PFD_OUT	PD output
7	LOGIC_GND	Digital ground
8	TEST	Test input with pull-down resistor (normally open or L)
9	PFD_INHIBIT	Control pin for PD (H : PD disable (Hi impedance state), L : PD enable)
10	VCO_INHIBIT	VCO mode select (H : VCOOUT disable (L fix), L : VCOOUT enable)
11	VCO_GND	Ground for VCO (analog ground)
12	VCO_IN	VCO control voltage input
13	BIAS	For adjusting VCO output frequency range (An external resistor connect between VCO_VDD and BIAS)
14	VCO_VDD	Power supply for VCO (Analog power supply)

● Block Diagram



● Pin Function

No.	Pin Name	I/O	Pin Function
1	P94/DA ₁	I/O	8-bit I/O port P9 with same function as port P0
2	P93/DA ₀	I/O	8-bit I/O port P9 with same function as port P0
3	P92/TB2 _{IN}	I/O	8-bit I/O port P9 with same function as port P0
4	P91/TB1 _{IN}	I/O	8-bit I/O port P9 with same function as port P0
5	P90/TB0 _{IN}	I/O	8-bit I/O port P9 with same function as port P0
6	FV _{CC}	–	Power supply input for flash memory (5V ± 0.5V)
7	CNV _{SS}	I	Connect to V _{SS}
8	V _{CONT}	–	Connect to filter circuit
9	FMD	I	Connect to V _{SS}
10	RESET	I	Reset input The microcomputer is reset when L level is input to this pin

No.	Pin Name	I/O	Pin Function
11	XOUT	O	Clock output
12	VSS	–	Power supply (0V)
13	XIN	I	Clock input
14	VCC	–	Power supply (3.3V ± 0.3V)
15	NMI	I	NMI interrupt input
16	P84/INT ₂	I/O	5-bit I/O port P8 with same function as port P0
17	P83/INT ₁	I/O	5-bit I/O port P8 with same function as port P0
18	P82/INT ₀	I/O	5-bit I/O port P8 with same function as port P0
19	P81/TA4IN	I/O	5-bit I/O port P8 with same function as port P0
20	P80/TA4OUT	I/O	5-bit I/O port P8 with same function as port P0
21	P77/KI ₃ /TA3IN	I/O	8-bit I/O port P7 with same function as port P0
22	P76/KI ₂ /TA3OUT	I/O	8-bit I/O port P7 with same function as port P0
23	P75/KI ₁ /TA2IN	I/O	8-bit I/O port P7 with same function as port P0
24	P74/KI ₀ /TA2OUT	I/O	8-bit I/O port P7 with same function as port P0
25	P73/TA1IN	I/O	8-bit I/O port P7 with same function as port P0
26	P72/TA1OUT	I/O	8-bit I/O port P7 with same function as port P0
27	P71/TA0IN	I/O	8-bit I/O port P7 with same function as port P0
28	P70/TA0OUT	I/O	8-bit I/O port P7 with same function as port P0
29	P67/TxD ₁	I/O	8-bit I/O port P6 with same function as port P0
30	P66/RxD ₁	I/O	8-bit I/O port P6 with same function as port P0
31	P65/CLK ₁ /CTS ₁	I/O	8-bit I/O port P6 with same function as port P0
32	P64/CTS ₁ /RTS ₁	I/O	8-bit I/O port P6 with same function as port P0
33	P63/TxD ₀	I/O	8-bit I/O port P6 with same function as port P0
34	P62/RxD ₀	I/O	8-bit I/O port P6 with same function as port P0
35	P61/CLK ₀ /CTS ₀	I/O	8-bit I/O port P6 with same function as port P0
36	P60/CTS ₀ /RTS ₀	I/O	8-bit I/O port P6 with same function as port P0
37	P57/RDY	I/O	Single-chip mode : 8-bit I/O port P5 with same function as port P0 Memory expansion mode : function as RDY
38	P56/ALE	I/O	Single-chip mode : 8-bit I/O port P5 with same function as port P0 Memory expansion mode : function as ALE
39	P55/HOLD	I/O	Single-chip mode : 8-bit I/O port P5 with same function as port P0 Memory expansion mode : function as HOLD
40	P54/HLDA	I/O	Single-chip mode : 8-bit I/O port P5 with same function as port P0 Memory expansion mode : function as HLDA
41	P53/BCLK/CLKOUT	I/O	Single-chip mode : 8-bit I/O port P5 with same function as port P0 Memory expansion mode : function as CLKOUT
42	P52/RD	I/O	Single-chip mode : 8-bit I/O port P5 with same function as port P0 Memory expansion mode : function as RD
43	P51/WRH/BHE	I/O	Single-chip mode : 8-bit I/O port P5 with same function as port P0 Memory expansion mode : function as WRH / BHE
44	P50/WRL/WR	I/O	Single-chip mode : 8-bit I/O port P5 with same function as port P0 Memory expansion mode : function as WRL / WR
45	P47/A ₂₃ /CS ₀	I/O	Single-chip mode : 8-bit I/O port P4 with same function as port P0 Memory expansion mode : High-order 8-bit of address output, function as CS ₀
46	P46/A ₂₂ /CS ₁	I/O	Single-chip mode : 8-bit I/O port P4 with same function as port P0 Memory expansion mode : High-order 8-bit of address output, function as CS ₁
47	P45/A ₂₁ /CS ₂	I/O	Single-chip mode : 8-bit I/O port P4 with same function as port P0 Memory expansion mode : High-order 8-bit of address output, function as CS ₂
48	P44/A ₂₀ /CS ₃	I/O	Single-chip mode : 8-bit I/O port P4 with same function as port P0 Memory expansion mode : High-order 8-bit of address output, function as CS ₃

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No.	Pin Name	I/O	Pin Function
49	P43/A19	I/O	Single-chip mode : 8-bit I/O port P4 with same function as port P0 Memory expansion mode : High-order 8-bit of address output
50	P42/A18	I/O	Single-chip mode : 8-bit I/O port P4 with same function as port P0 Memory expansion mode : High-order 8-bit of address output
51	P41/A17	I/O	Single-chip mode : 8-bit I/O port P4 with same function as port P0 Memory expansion mode : High-order 8-bit of address output
52	P40/A16	I/O	Single-chip mode : 8-bit I/O port P4 with same function as port P0 Memory expansion mode : High-order 8-bit of address output
53	P37/A15	I/O	Single-chip mode : 8-bit I/O port P3 with same function as port P0 Memory expansion mode : Middle-order 8-bit of address output
54	P36/A14	I/O	Single-chip mode : 8-bit I/O port P3 with same function as port P0 Memory expansion mode : Middle-order 8-bit of address output
55	P35/A13	I/O	Single-chip mode : 8-bit I/O port P3 with same function as port P0 Memory expansion mode : Middle-order 8-bit of address output
56	P34/A12	I/O	Single-chip mode : 8-bit I/O port P3 with same function as port P0 Memory expansion mode : Middle-order 8-bit of address output
57	P33/A11	I/O	Single-chip mode : 8-bit I/O port P3 with same function as port P0 Memory expansion mode : Middle-order 8-bit of address output
58	P32/A10	I/O	Single-chip mode : 8-bit I/O port P3 with same function as port P0 Memory expansion mode : Middle-order 8-bit of address output
59	P31/A9	I/O	Single-chip mode : 8-bit I/O port P3 with same function as port P0 Memory expansion mode : Middle-order 8-bit of address output
60	VCC	–	Power supply (3.3V \pm 0.3V)
61	P30/A8	I/O	Single-chip mode : 8-bit I/O port P3 with same function as port P0 Memory expansion mode : Middle-order 8-bit of address output
62	VSS	–	Power supply (0V)
63	P27/A7/(D7)	I/O	Single-chip mode : 8-bit I/O port P2 with same function as port P0 Memory expansion mode : Low-order 8-bit of address output, Low-order 8-bit of data input/output
64	P26/A6/(D6)	I/O	Single-chip mode : 8-bit I/O port P2 with same function as port P0 Memory expansion mode : Low-order 8-bit of address output, Low-order 8-bit of data input/output
65	P25/A5/(D5)	I/O	Single-chip mode : 8-bit I/O port P2 with same function as port P0 Memory expansion mode : Low-order 8-bit of address output, Low-order 8-bit of data input/output
66	P24/A4/(D4)	I/O	Single-chip mode : 8-bit I/O port P2 with same function as port P0 Memory expansion mode : Low-order 8-bit of address output, Low-order 8-bit of data input/output
67	P23/A3/(D3)	I/O	Single-chip mode : 8-bit I/O port P2 with same function as port P0 Memory expansion mode : Low-order 8-bit of address output, Low-order 8-bit of data input/output
68	P22/A2/(D2)	I/O	Single-chip mode : 8-bit I/O port P2 with same function as port P0 Memory expansion mode : Low-order 8-bit of address output, Low-order 8-bit of data input/output
69	P21/A1/(D1)	I/O	Single-chip mode : 8-bit I/O port P2 with same function as port P0 Memory expansion mode : Low-order 8-bit of address output, Low-order 8-bit of data input/output
70	P20/A0/(D0)	I/O	Single-chip mode : 8-bit I/O port P2 with same function as port P0 Memory expansion mode : Low-order 8-bit of address output, Low-order 8-bit of data input/output
71	P17/D15	I/O	Single-chip mode : 8-bit I/O port P1 with same function as port P0 Memory expansion mode : High-order 8-bit of data input/output
72	P16/D14	I/O	Single-chip mode : 8-bit I/O port P1 with same function as port P0 Memory expansion mode : High-order 8-bit of data input/output
73	P15/D13	I/O	Single-chip mode : 8-bit I/O port P1 with same function as port P0 Memory expansion mode : High-order 8-bit of data input/output

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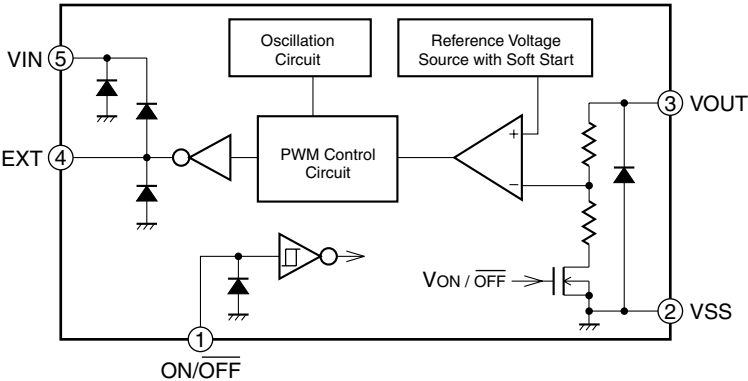
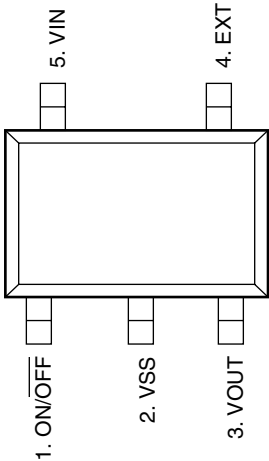
No.	Pin Name	I/O	Pin Function
74	P14/D12	I/O	Single-chip mode : 8-bit I/O port P1 with same function as port P0 Memory expansion mode : High-order 8-bit of data input/output
75	P13/D11	I/O	Single-chip mode : 8-bit I/O port P1 with same function as port P0 Memory expansion mode : High-order 8-bit of data input/output
76	P12/D10	I/O	Single-chip mode : 8-bit I/O port P1 with same function as port P0 Memory expansion mode : High-order 8-bit of data input/output
77	P11/D9	I/O	Single-chip mode : 8-bit I/O port P1 with same function as port P0 Memory expansion mode : High-order 8-bit of data input/output
78	P10/D8	I/O	Single-chip mode : 8-bit I/O port P1 with same function as port P0 Memory expansion mode : High-order 8-bit of data input/output
79	P07/D7	I/O	Single-chip mode : 8-bit CMOS I/O port P0 Memory expansion mode : Low-order 8-bit of data input/output
80	P06/D6	I/O	Single-chip mode : 8-bit CMOS I/O port P0 Memory expansion mode : Low-order 8-bit of data input/output
81	P05/D5	I/O	Single-chip mode : 8-bit CMOS I/O port P0 Memory expansion mode : Low-order 8-bit of data input/output
82	P04/D4	I/O	Single-chip mode : 8-bit CMOS I/O port P0 Memory expansion mode : Low-order 8-bit of data input/output
83	P03/D3	I/O	Single-chip mode : 8-bit CMOS I/O port P0 Memory expansion mode : Low-order 8-bit of data input/output
84	P02/D2	I/O	Single-chip mode : 8-bit CMOS I/O port P0 Memory expansion mode : Low-order 8-bit of data input/output
85	P01/D1	I/O	Single-chip mode : 8-bit CMOS I/O port P0 Memory expansion mode : Low-order 8-bit of data input/output
86	P00/D0	I/O	Single-chip mode : 8-bit CMOS I/O port P0 Memory expansion mode : Low-order 8-bit of data input/output
87	P107/AN7	I/O	8-bit I/O port P10 with same function as port P0
88	P106/AN6	I/O	8-bit I/O port P10 with same function as port P0
89	P105/AN5	I/O	8-bit I/O port P10 with same function as port P0
90	P104/AN4	I/O	8-bit I/O port P10 with same function as port P0
91	P103/AN3	I/O	8-bit I/O port P10 with same function as port P0
92	P102/AN2	I/O	8-bit I/O port P10 with same function as port P0
93	P101/AN1	I/O	8-bit I/O port P10 with same function as port P0
94	AVSS	–	Analog power supply, connect to Vss
95	P100/AN0	I/O	8-bit I/O port P10 with same function as port P0
96	VREF	I	Reference voltage input
97	AVCC	–	Analog power supply, connect to Vcc
98	P97/INT4/ADTRG	I/O	8-bit I/O port P9 with same function as port P0
99	P96/INT3	I/O	8-bit I/O port P9 with same function as port P0
100	P95/DA2	I/O	8-bit I/O port P9 with same function as port P0

S-8520X15MC-LYA (MAIN ASSY : IC402)

• PWM Control Step-down Switching Regulator-controller

● Pin Arrangement (topview)

● Block Diagram



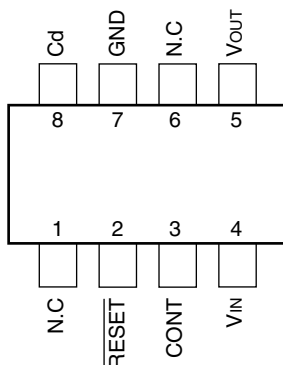
● Pin Function

No.	Pin Name	Pin Function
1	ON/ $\overline{\text{OFF}}$	Power off pin H = Normal operation (Step-down operation) L = Step-down operation stopped (All circuits deactivated)
2	VSS	Ground pin
3	VOUT	Output voltage monitoring pin
4	EXT	Connection pin for external transistor
5	VIN	IC power supply pin

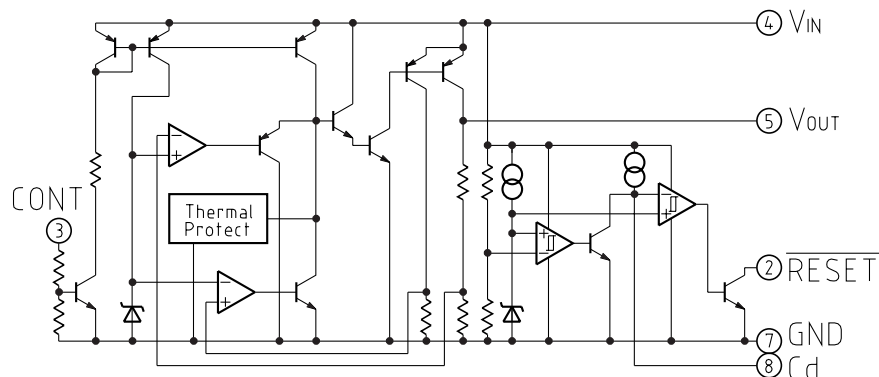
MM1478RFBE (MAIN ASSY : IC403)

• Regulator + Reset IC

● Pin Arrangement (topview)



● Block Diagram



● Pin Function

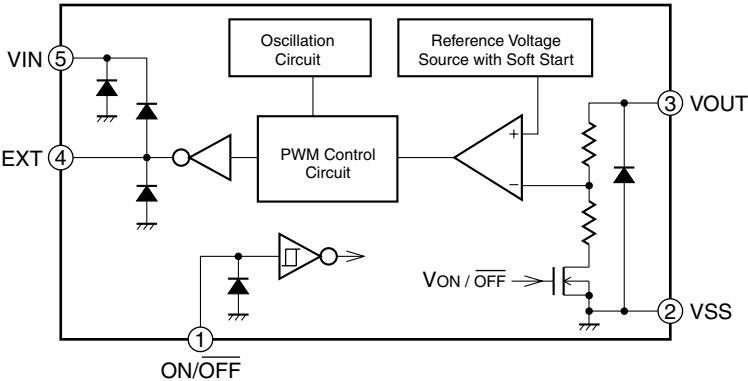
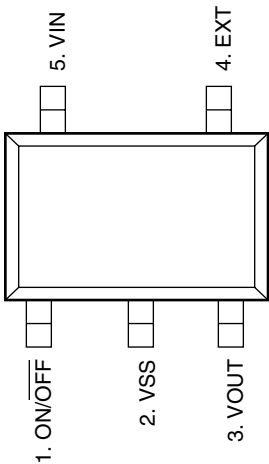
No.	Pin Name	Pin Function						
1	N.C	Not used						
2	$\overline{\text{RESET}}$	Input voltage detection output Input voltage detection output pin RESET pin logic <table><tr><td></td><td>$\overline{\text{RESET}}$</td></tr><tr><td>$V_{\text{IN}} < V_{\text{S}}$</td><td>L</td></tr><tr><td>$V_{\text{IN}} > V_{\text{S}}$</td><td>H</td></tr></table>		$\overline{\text{RESET}}$	$V_{\text{IN}} < V_{\text{S}}$	L	$V_{\text{IN}} > V_{\text{S}}$	H
	$\overline{\text{RESET}}$							
$V_{\text{IN}} < V_{\text{S}}$	L							
$V_{\text{IN}} > V_{\text{S}}$	H							
3	CONT	Output voltage on / off control pin <table><tr><td>VCONT</td><td>OUTPUT</td></tr><tr><td>L</td><td>OFF</td></tr><tr><td>H</td><td>ON</td></tr></table> Connect CONT pin with V_{IN} , when it is not used.	VCONT	OUTPUT	L	OFF	H	ON
VCONT	OUTPUT							
L	OFF							
H	ON							
4	V_{IN}	Power supply input pin						
5	V_{OUT}	Regulator output pin						
6	N.C	Not used						
7	GND	Ground pin						
8	Cd	Delay time setting pin RESET pin output delay time can be set by the capacitance connected to the Cd pin. $t_{\text{PLH}} = 100000 \cdot C$ t_{PLH} : transmission delay time [s] C : capacitor value [F]						

S-8520X52MC-LZL (MAIN ASSY : IC404)

• PWM Control Step-down Switching Regulator-controller

● Pin Arrangement (topview)

● Block Diagram



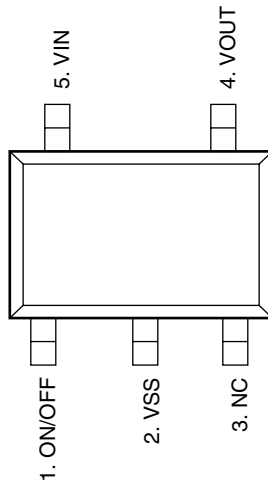
● Pin Function

No.	Pin Name	Pin Function
1	ON/ $\overline{\text{OFF}}$	Power off pin H = Normal operation (Step-down operation) L = Step-down operation stopped (All circuits deactivated)
2	VSS	Ground pin
3	VOUT	Output voltage monitoring pin
4	EXT	Connection pin for external transistor
5	VIN	IC power supply pin

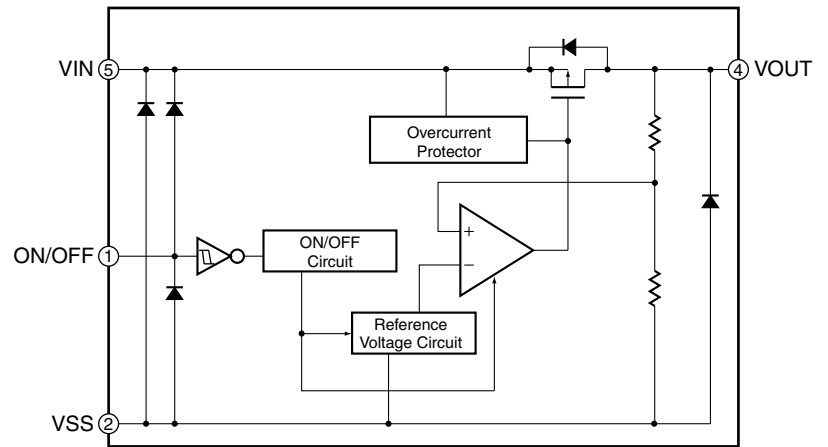
■ S-T111B25MC-OGK (MAIN ASSY : IC405)

- High Ripple-rejection Low Dropout CMOS Voltage Regulator

● Pin Arrangement (topview)



● Block Diagram



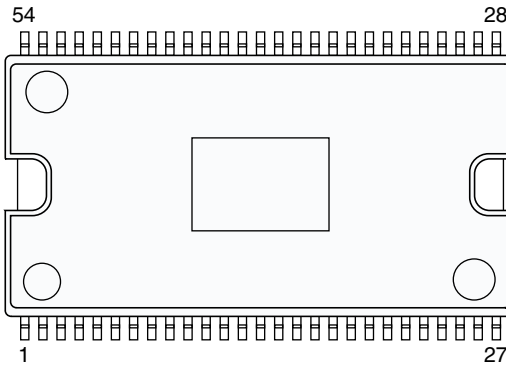
● Pin Function

No.	Pin Name	Pin Function
1	ON/OFF	Power off pin
2	VSS	Ground pin
3	NC	Not used
4	VOUT	Voltage output pin
5	VIN	Voltage input pin

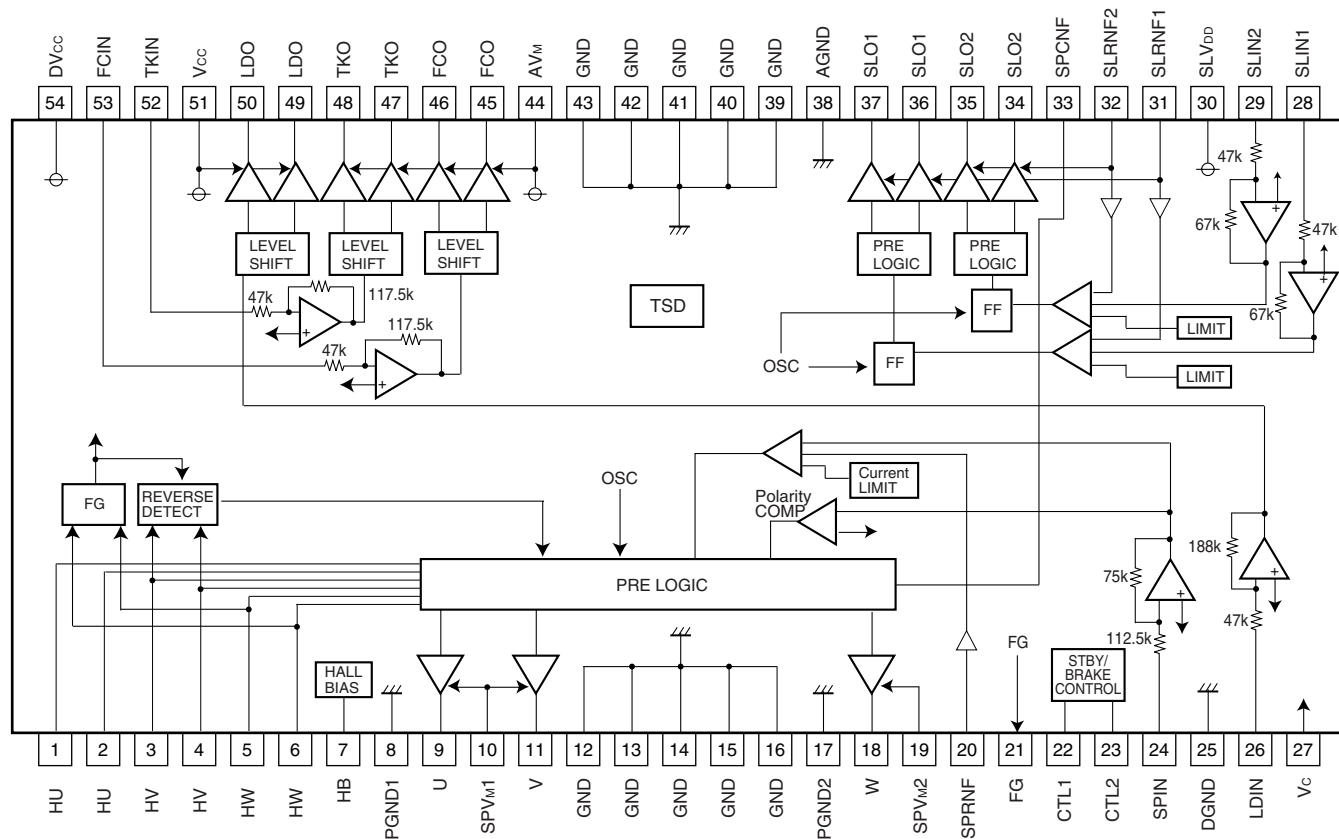
BD7905BFS (MAIN ASSY : IC501)

• 6-ch Power Compo. Driver

• Pin Arrangement (topview)



• Block Diagram



● Pin Function

No.	Pin Name	Pin Function	No.	Pin Name	Pin Function
1	HU+	Hall signal U+ input	28	SLIN1	Sled motor driver input 1
2	HU-	Hall signal U- input	29	SLIN2	Sled motor driver input 2
3	HV+	Hall signal V+ input	30	SLVDD	Sled motor MOS pre-power supply
4	HV-	Hall signal V- input	31	SLRNF1	Sled motor driver 1 current detect input
5	HW+	Hall signal W+ input	32	SLRNF2	Sled motor driver 2 current detect input
6	HW-	Hall signal W- input	33	SPCNF	Spindle driver filter pin
7	HB	Hall bias	34	SLO2-	Sled motor driver 2 negative output
8	PGND1	Ground 1 for spindle	35	SLO2+	Sled motor driver 2 positive output
9	U	Spindle driver phase U output	36	SLO1-	Sled motor driver 1 negative output
10	SPVM1	Power supply input for spindle	37	SLO1+	Sled motor driver 1 positive output
11	V	Spindle driver phase V output	38	AGND	BTL block, sled motor driver power ground
12	GND	Ground	39	GND	Ground
13	GND	Ground	40	GND	Ground
14	GND	Ground	41	GND	Ground
15	GND	Ground	42	GND	Ground
16	GND	Ground	43	GND	Ground
17	PGND2	Ground 2 for spindle	44	AVM	Actuator driver power supply
18	W	Spindle driver phase W output	45	FCO-	Focus driver negative output
19	SPVM2	Power supply input for spindle	46	FCO+	Focus driver positive output
20	SPRNF	Spindle driver current detect input	47	TKO-	Tracking driver negative output
21	FG	FG signal output	48	TKO+	Tracking driver positive output
22	CTL1	Driver logic control input 1	49	LDO-	Loading driver negative output
23	CTL2	Driver logic control input 2	50	LDO+	Loading driver positive output
24	SPIN	Spindle driver control input	51	Vcc	BTL block, loading power ground
25	DGND	PWM block pre-ground	52	TKIN	Tracking driver input
26	LDIN	Loading input	53	FCIN	Focus driver input
27	Vc	Control reference voltage input	54	DVcc	PWM block control power supply

■ **TC74HC375AF (WIFB ASSY : IC904)**

A

● 4-bit D Type Latch

● **Pin Arrangement (topview)**

B

■

C

■

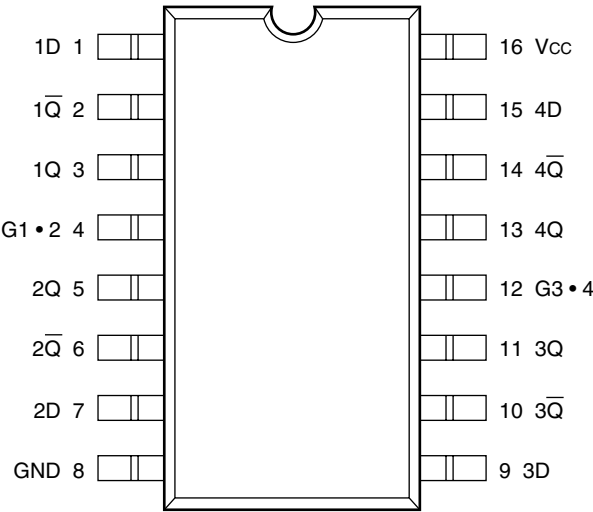
D

■

E

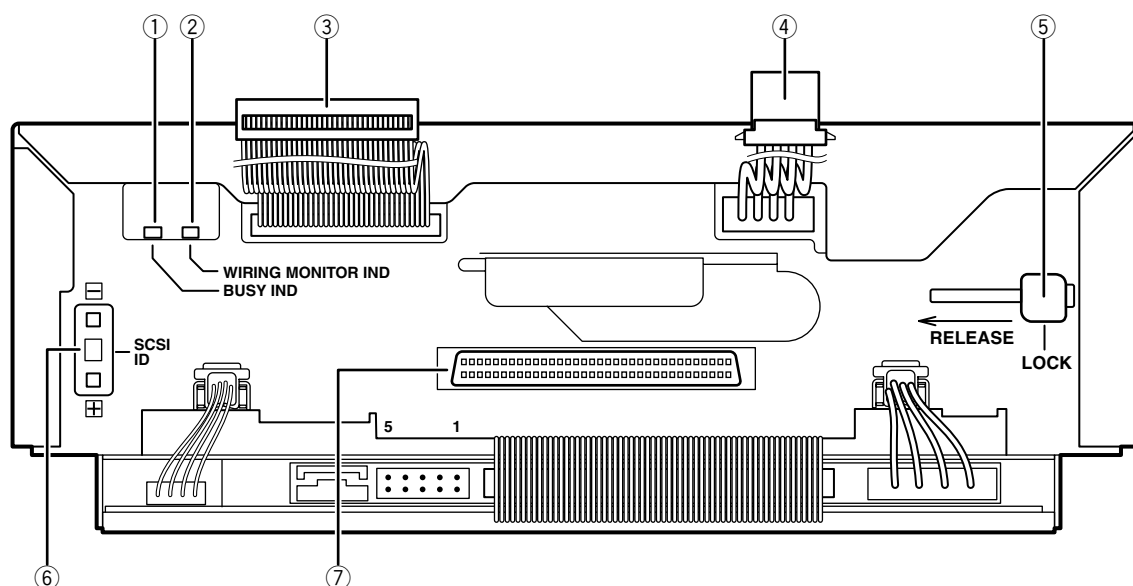
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F



8. PANEL FACILITIES

● REAR VIEW



① Busy indicator

Lights when drive is busy.

② Wiring monitor indicator

Meaning of indicator when indicator is lit up:

- Lights when drive has been installed in changer and power cable is connected.

Meaning of indicator when indicator flashes in 2-second intervals:

- This indicator flashes in 2-second intervals when the drive is installed in a changer and its changer interface cable has been connected.

Meaning of indicator when indicator flashes in 0.5-second intervals:

- This indicator flashes in 0.5-second intervals when the drive in question has been specified as the drive to be swapped during the swapping of drives.

③ Changer interface cable

This cable must be connected to the changer interface connector located in the changer.

④ Power cable

This cable must be connected to the power inlet located in the changer.

⑤ Lock lever

When a drive is to be removed from the changer, flip the lock lever to the released position and then pull the drive out from the changer.

⑥ SCSI ID switch

Set the Drive SCSI ID. Press the upper button to decrement the number, and the lower button to increment the number. Factory default: "0".

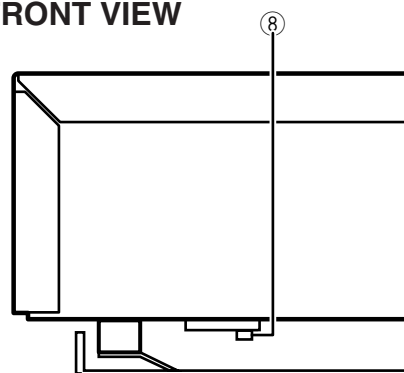
⑦ LVD SCSI interface connector

Use to connect an optional LVD drive connector panel (DRM-LN721, for 2 drives; or DRM-LN741, for 4 drives).

NOTE:

Be careful not to allow any part of your body to come into contact with connector pins, as doing so may result in faulty connections or damage from static electricity.

FRONT VIEW



⑧ Busy indicator

Lights when drive is busy.

Jigs list

Jig No.	Jig Name	Remarks
GGs1030	Operation check program (Diagnose 5)	
GGP1061	Connector Assy (LVD)	
GGP1062	SCSI cable (LVD)	
GGP1063	SCSI terminator (LVD)	
GGV1027	CD-ROM (CDT-304)	
GGV1067	Recorded CD-R	
GGV1035	DVD-ROM (Single/DVDT-001)	
GGV1036	DVD-ROM (Dual/DVDT-002)	
GGV1231	Recorded DVD-R (8x DISC)	
GGV1232	DVD-R blank disc (8x DISC)	
GGF1485	Special device for RS-232C communication for the changer drive	used for short-circuiting XCLMP
GGs1067	Updater 3.2.3.6.exe	

Operational check items after repair

Random reading 300 times		
Discs to be used	GGV1027	CD-ROM (CDT-304)
	GGV1067	Recorded CD-R
	GGV1035	DVD-ROM (Single/DVDT-001)
	GGV1036	DVD-ROM (Dual/DVDT-002)
	GGV1231	Recorded DVD-R (8x DISC)
Writing at the innermost and outermost tracks		
Discs to be used	GGV1232	DVD-R blank disc (8x DISC)